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food DIGEST

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FOOD DIGEST

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National Information Centre for Food Science and Technology
Central Food Technological Research Institute,
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and the entire pack is completed with a corrugated case.

Development of Captech follows a worldwide trend to chilled meat rather than frozen meat which, says UEB, forced the New Zealand meat industry to change its traditional export methods.

According to UEB, existing technology using vacuum packed barrier bags gave chilled meat a realistic storage life of only eight to nine weeks, an insufficient margin to allow for variations in production, sea freighting and distribution to European markets. Air freight is not an economic option.

"Captech enables chilled beef and lamb to store for at least 16 weeks, more than doubling storage time previously guaranteed by other systems.

Mr Higgs added: "Probably one of the most significant benefits is that Captech offers the opportunity to sell very tender meat by using the controlled extended shelf life available which increases tenderness while maintaining meat texture".

(Packaging News November 1988, 63)

3 Non-toxic pesticide from neem seed

An extract of the seed of the neem tree (a tree indigenous in India) could become a viable natural pesticide, if entomologists at the University of British Columbia and colleagues at Safer Ltd., successfully extend the extract's stability.

The active component azadirachtin, is not a neurotoxin, but acts as anti-feedant and interferes with insect moulting hormones, making it virtually non-toxic for animals.

(Chemical Weekly 34(14), 1988, 81)

4 Natural sweetener

A refined natural low-calorie sweetener extracted from the leaves of the herb Stevia rebaudiana Bertoni is offered. The Stevia Plant, grown in Paraguay, South America, was originally used by the Guarani Indios for sweetening their drinks. Stevia Sweet is non-calorie sweetener, does not cause tooth decay, is suitable for diabetics and is also 150-300 times sweeter than sugar in the same concentration, it is said. It can be used in low-calorie soft drinks, health food sweets and biscuits, chewing-gums and desserts. Stevia sweetner in powder or liquid form is useful as a food additive or as a tabletop sweetener in granulated and tablet form. The sweetener is easily soluble in water or alcohol, has good ph-stability [illegible] broad range, and is heat stable and stable.

(*Chemical Products Finder* 7(6), 1988, 93)

5 A more stable form of VIT-C for food use

Rangen Inc., Buhl, Idaho, USA, has announced the development of 3 more stable form of Vit C. The product will be initially marketed as an additive in fish feed, but it has the potential to extend to the human products market.

This modified Vit C is said not to oxidize because its vulnerable flank is protected by the phosphate molecule that is attached to it. Therefore, the product can be stored, exposed to air, heat and water and last much longer. But when the vitamin enters the body of a fish or human, certain enzymes takes the protective phosphate radical away, forming the vitamin for use.

Paul Sert a professor at Kansas State University developed this stable form of ascorbic acid and the patent is issued by the Kansas State University Research Foundation.

(*Chemical Weekly* 34(14), 1988, 83)

PROCESSES

6 High protein food bars and meatless meat pies

Researchers at Provesta Corporation (a subsidiary of Phillips Petroleum) would like to see everyone munching on a synthetic meal with minimum of cooking time. Last July Provesta has started test marketing its new food bar in USA, made with 'Provesteen', a high protein yeast grown in fermentation tank. The food bar is combined with ingredients such as wheat bran and pineapple and is designed as a meal substitute, rather than a snack.

The race is on to develop food products from these single cell proteins (SCP). Using a similar fermentation technology two British companies, Hanks, Hovis and Macdougal and ICI are producing a material that can assume the texture of beef, chicken - or even potato chips.

The material, a fungus, is then combined with flavourings, spices or fillers to simulate the taste of the desired final product. By enhancing or suppressing the texture, the fungus could resemble a food such as potato chip. Called RHM's protein, it is reported to be high in protein, low in fat, sodium and cholesterol and with a protein superior to soy. RHM's protein was approved for use in Britain in October 1985 and is currently being sold on frozen patties (meat pies).

(Chemical Weekly 34(18), 1989, 83-84)

7 Alcohol distillation by solar energy

In a pioneering development, scientists at the Nimbkar Agricultural Research Institute (NARI), Phaltan, Maharashtra, have produced industrial alcohol from sweet sorghum with the help of solar energy.

A pilot plant, the first in Asia, capable of producing upto 50 litres of 90 to 95 per cent pure industrial grade alcohol per day and running completely on solar energy has been set up on the NARI campus.

The plant consists of 38 metre-squared flat plate solar collectors and a 2150-litre hot water storage tank. The distillation column is 5.5 metres long.

On an annual basis, 75 per cent of the total energy supplied for distillation comes from solar energy, while the rest is taken care of by using fossil fuel. There is a tremendous saving of fossil fuel, according to NARI Director Dr. Anil K. Rajvanshi. The project has been supported by the Department of Nonconventional Energy Sources.

"Another very innovative feature of the project is the development of complete technology of alcohol production from sweet sorghum", says Dr. Rajvanshi. Sweet sorghum (Sorghum bicolor L. (Moench) is a multipurpose crop; it yields grain from flour from its earhead; the stalks provide sugary juice which can be fermented to yield alcohol; and the bagasse provides fodder for animals. Thus one crop from the same piece of land provides food, fuel and fodder. "No other crop yields all these three things together", said Dr. Rajvanshi.

The scheme for alcohol production from sweet sorghum has been developed so that alcohol can replace kerosene for cooking and lighting. India imports about Rs. 15,000 million worth of kerosene every year and alcohol production from a crop which does not take land away from food production is extremely attractive proposition for the country. Scientists at NARI have also produced efficient lantern and stoves which run on alcohol. Thus the use of alcohol for lighting and cooking has been technically proved. At present NARI is in the process of designing mini-distilleries of 5000 litres per day.

"The potential of alcohol from sweet sorghum to replace kerosene as cooking and lighting energy and also as an automotive fuel is also tremendous" said Dr. Rajvanshi. Thus, if the land which is under cultivation of grain sorghum in Maharashtra is brought under cultivation of sweet sorghum, there will be a yield of 12 million tonnes of grain per year, and 26 billion litres of alcohol per year. This amount of alcohol can completely take care of all the petrol consumption of India for the year 2005 A.D.

(P.T.I. Science Service 8(1), 1989, 2-3)

8 Separating alcohol from water

Tokuyama Soda Co. and Katokichi Co. have jointly developed a chitosan based membrane designed to separate high-purity alcohol from water at high efficiency. The membrane calls for smaller amounts of energy - only one-third to half that needed in the case of a conventional evaporation process and facilitates manufacture of compact separation equipment.

The two companies have transformed chitosan derivatives into hollow-fiber membranes and tied together several thousand units of the products, thereby producing a membrane module having a $2m^2$-wide effective area. They have confirmed that the module is capable of filtering only water from a water alcohol mixture at high speed within a wide temperature range covering from room temperature to 70°C.

They expect the new product to be extensively applied to production of high-purity alcohol, concentration of ethanol, dehydration of mixed organic solvents, recycling of alcohol based solvents and removal of water from bio-reactors, etc.

Prior to development of the new product, Katokichi successfully separated chitin and chitosan from lobster/prawn/shrimp shells and found that the two substances help separate alcohol from water. Tokuyama Soda pioneered a method for producing a membrane therefrom.

(Chemical Weekly 34(20), 1989, 111)

9 Mushroom based beverage

A Chinese institute offers know-how for manufacturing a nutritious mushrooms-based beverage free of chemical additives.

The process involves the formation of a submerged culture of malt wort, soyabean juice and edible mushroom.

Formulated by Beijing Food Research Institute the beverage contains, among others, the following : amino acids, organic acid, minerals, Vitamins, polysaccharides, ribonucleic acid.

Raw-materials needed are malt wort, soya been and edible mushroom.

To produce 80,000 bottles, each with 250 ml, would require 5,000 kg. of malt wort.

A flat-fee of US $ 400 000 is required for technology or a payment of US $ 150 000 and 5 per cent share of profits for 10 years. This includes fees for the formulation, bacteria strain, equipment and training of personnel.

For more information, contact: Bejing Food Research Institute, No.3, Hong-tong Xians Dong-zong-bu Hutong, Beijing China.
(*Indian Food Packer* 42(5), 1988, 64-65)

10 Oil from agricultural residues

Scientists at the Indian Institute of Technology (IIT), Delhi are reported to have developed a process to produce oil from agricultural residues such as straw. The lab scale process developed at the IIT Biochemical Engineering Research Centre (BERC) makes the cells of the yeast "Rodhoturula giracilis" use either rice straw or sugarcane molasses to churn out oil. The microbial oil is comparable to palm oil in composition and could be used as a substitute for industrial oils in the country.

The IIT team has estimated the production potential of microbial oil to be about 350 kilograms per hectare from rice straw and 200 kilograms per hectare from sugarcane molasses.

Yeast cells are tiny micro-organisms capable of digesting sugar molecules obtained from rice straw or molasses and producing oil.

The BERC process involves feeding the sugar from the agricultural residues into a device called a bio-reactor that contains a nutrient medium for the yeast. Yeast cells inside the reactor begin to digest the sugar and within a few days start manufacturing the oil.

The cells yield upto 50 per cent of their weight in oil and leave behind nearly 45 per cent of protein-rich cellular matter which can be used as cattle or poultry feed. A cost analysis done at the BERC has indicated that the microbial oil would cost Rs. 13 or Rs. 16 per kilogram depending whether it is extracted from rice straw or molasses bioreactions.
(University News 27(3), 1989, 10)

11 Cholesterol-free butter

Active research is in progress for removal of cholesterol from butter fat by employing supercritical CO_2.

In laboratory scale tests at Supercritical Processing Inc. (SCP), Allentown, Pa), 20% of the cholesterol in butter was removed. SCP sparges supercritical CO_2 at 40°C and 2000-2500 psig into the bottom of a one-litre still pot containing a batch feed. The solvent passes upto a 4 ft packed column, where it is refluxed. The researchers explain that a fraction of the extract is pumped back into the column to obtain higher cholesterol removal (only 15% is extracted in a simple batch process) and that multistaging can increase the amount removed even more. SCP is looking for support to develop the process further.

Another batch process is reported to remove 90% of the cholesterol. This process developed by Phasex Corp (Lawrence, Mass.) in cooperation with the University of Wisconsin (Madison). The process uses supercritical CO_2 at 60-80°C and about 2,200 psi reports Vai Krukonis, the principal researcher. The higher temperature makes for higher selectivity. So far the method has been tested on a laboratory scale, but researchers are planning to scale it up to a few pounds of butter.
(Chemical Weekly 34(14), 1988, 84)

12 Sunflower protein for the food industry

A Research team at the Commonwealth Scientific and Industrail Research Organization (CSIRO)'s Division of Food Research in Melbourne has developed and patented a continuous process for extracting protein from sunflower meal. The process could be utilised by the food industry to yield colourless protein powder for use in nutritious new product lines.

The CSIRO division has designed a continuous pilot plant that used counter-current extraction through a number of vats. It can process 80 kg of defatted sunflower-seed meal per hour. The method also involves ultrafiltration to concentrate the protein extract and spray-drying to produce a colourless protein powder.

Scientists at the Division have prepared a number of food products incorporating the protein extract. These include mayonnaise, biscuits and cakes. For some food products, the sunflower protein could replace imported soyabean protein.

A key factor in the commercial potential of the extract is that it is isolated free of colour. The nutritive value of the protein is being evaluated.

(*Beverage and Food World* 15(4), 1988, 67)

BY-PRODUCTS AND WASTE UTILIZATION

13 New machine can process rice bran into cooking oils

A Houston, Texas company and a California firm have unavailed a machine that allows rice bran to be processed into a high-grade cooking oil and a defatted bran for use in baking.

ASI Controls Inc. of Houston and Brady International Inc. of Torrance, described the machine as "revolutionary" because rice bran's present use is primarily as an animal feed.

The machine uses pressure and heat to destroy the enzymes that cause the bran to turn rancid. The companies said this allows recovery of the 19 to 33 per cent of edible oil that can be used for salad oil or cooking oil. The remaining defatted bran is said to be as good or better than other cereal grains for making cakes, cookies, pastries and breads.

The machine is installed in the bran stream in rice mills. Once stabilized, the bran can be transported by truck ship or barge to an extraction plant.

ASI and Brady International cooperatively developed both the physical parameters of the desk-sized machine plus the electronic controls for it. ASI has 36 machines completed, said ASI President J.E. House, who anticipates that 30 to 50 per month will be shipped out of Houston for the next several years.

India alone will be able to save at least $ 1.25 billion a year on imports of edible oil for cooking, according to Dan McPeak, president of Brady International.

There are other systems for stabilizing bran, including parboiling, a technique used to make rice that will cook without sticking. Some Houston mills have used parboiling extensively for years.

An interesting sidelight is that rice bran contains a high level of fiber. Scientists still do not know whether it is as good, or better, than other forms of fiber such as oats for lowering blood cholesterol levels, the researcher said.
(SEA *News Circular* 11(12), 1988, 38-39)

PROCESSED PRODUCTS

-Nil-

EQUIPMENT AND MACHINERY

14 Extraction and bottling plant

An Indian public sector company is offering the technology for a semi-automatic plant for extracting, canning or bottling juices from fruits like grapes, apples and pineapples.

According to the National Small Industries Corporation Limited (NSIC), the process is economical.

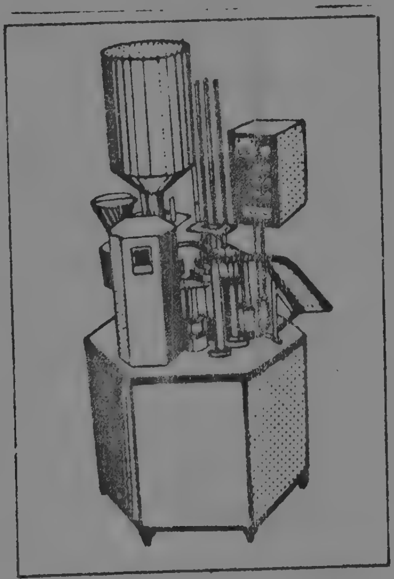
The production and process involves fruit preparation, juice extraction, pasteurisation and processing, and canning or bottling.

NSIC is engaged in promoting and developing small-scale industries. Its services include financing, export, marketing and technical training.

For more information contact: Industrial Advisor, Technology Transfer Division, The National Small Industries Corporation Ltd., Laghu Udyog Bhavan, Okhla Industrial Estate, New Delhi - 110 020.
(*Economic and Commercial News* 19(1), 1989, 14)

15 Rotary type cup filling machine

Panpack Marketing has developed this automatic machine for accurately filling products from food and pharmaceutical. It is rotary type cup filling machine and is able to handle different size and shape of plastic cups. It can handle products like ice-cream, jam, honey, fruit juice, yoghurt, oil, cream, shrikhand, soft drink, butter margarine etc. The machine facilitates operation like cup release, filling station, dry nut/top filling, lid placing, heat sealing, ejecting, etc.



For more details write to: Panpack Marketing, P.O. Box 48, Panchal House, Near Municipality Office, Anand, Gujarat 388 001.
(*Chemical Products Finder* 7(8), 1989, 9)

16 Automatic filling/packing machine

This packing machine is designed through 100% application of high electronic technique and has special functions such as cartridge system, oilless system and one touch transfer system. It has compact design and can use cheap single unit film of polyethylene, polypropylene, sholex or highgex. It can automatically process filling and packing in desired size from a reel of film, can practice alignment of printed matter by photo electric tube control system. It can be operated with automatic balance, counter and automatic feeding system. It also can be operated in single packing with irregular feeding.

For more details write to: D.M. Singh and Son Pvt Ltd., Sole Agent in India, 1 Crooked Lane, Calcutta 700 069. (*Chemical Products Finder* 7(7), 1988, 119)

17 Automatic packaging machine for food processing

The 601 Four-Fin Seal Packaging Machine produces high quality pouches that are suitable for liquids, semi-liquids, powders, portion packages of condiments, and granulated products. This automatic form, fill, and seal machine operates at speeds ranging from 50 to 700 packages per minute, depending on the requirements. Its features include accurate heat control, easy to adjust vertical sealers, and positive cutoff and bag release.

For further information write to: Prodo-Pak Corporation, 77 Commerce St. P.O. Drawer D, Garfield, New Jersey 07026, U.S.A. (*Industrial Products Finder* 17(2), 1988, 146)

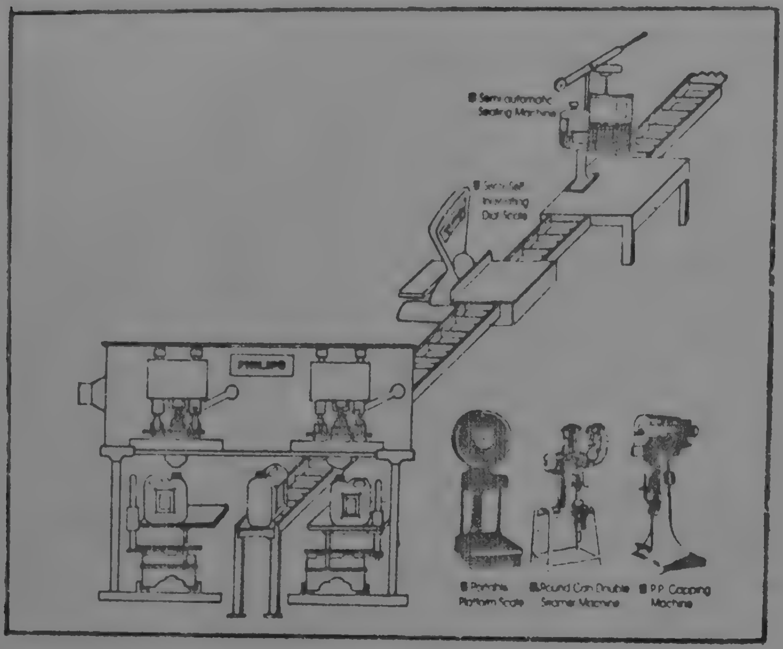
18 Automatic bagging and weighing machines

Mazda International Pvt Ltd manufactures a range of bagging and weighing machines which find applications in grains, animal feeds, solvent extraction plants, fertilisers, chemicals and many other industries. The machines are designed for automatic filling and weighing of materials from a few grams to 100 kilograms. The operating principle is that after the operator fixes the bag on the sack chute by the mechanical bag clamping device and then starts the machine for feeding operation, the product to be filled flows from the storage bin into the auxiliary hopper of the machine. The weighing scale consists of an equal armed double beam, balanced on knife-edge and 'V' bearings. One end of the beam carries a weight box in which required weights are kept and the other end carries the bag chute to which the empty bag is clamped. When the machine is switched on, the material starts pouring into the bag through the feed gat at a very fast speed. When 90% of the material is fed into the bag, the beam tips cut down the flow of the material to a slow dribble. When the exact quantity of the product to be weighed fills the bag (equivalent to the counter weights in the weight box) the swing gate completely shuts off any further flow of material into the bag. Alternate models for those requiring nett weighing systems are also available. These are suitable for tins and drums also. The filling capacity varies from 2 fills per minute to 15 fills per minute depending upon the product and the model. For models weighing 5 gm to 500 gm filling capacity of 10/14 fills per minute can be achieved. The weight variation is between ± 0.25% and 0.5% maximum. Also manufactured are belt conveyor systems, screw of slat conveyor systems, bucket elevators, vibratory screws, magnetic separators and portable stackers.

For more details write to: Mazda International Pvt Ltd., 79(1) World Trade Centre, Cuffee Parade, Colaba, Bombay 400 005. (Chemical Products Finder 7(7), 1988, 132)

19 Weigh and pack systems

St Joseph Engg Works manufactures Weigh and Pack Systems marketed under the brand name Philips. They are tailor made for continuous packing lines in industries such as vegetable oils, lubricating oils, refineries, chemical pharmaceutical, food canning, sugar, grains, paints, dyestuff, pesticides, textile, and cold storages. A typically designed Philips Weigh-n-Pack System comprises semi-automatic liquid filling and weighing machine, self indicating scale, capping and sealing machines and a suitable belt conveyor. Total systems can be offered as fully automatic with electronic equipment. The company offers systems in capacities from 1,200 containers per hour of 1 kg packs to 400 containers per hour of 15 kg packs. Higher capacities and models are custom engineered to suit specific requirements. The Philip brand product line includes a wide range of weighing scales, both electronic and manual weighbridges, packing, filling, sealing, seaming and capping machines, and electronic and manual counting scales.


Semi automatic Sealing Machine
Semi Self Indicating Dial Scale
PHILIPS
Portable Platform Scale
Round Can Double Seamer Machine
P.P. Capping Machine

For further information write to: St Joseph Engineering Works, 4/A Manish Commercial Centre, 3rd Floor, 216A Dr Annie Besant Road, Worli, Bombay 400 025.
(*Industrial Products Finder Annual 1988, 668*)

20 Carton over-wrapping and sealing machine

Auto-Wrap A.W. 120 is designed for over-wrapping and sealing of rectangular shaped cartons with cellophane or BOPP film. The film kept in coils are trimmed to the correct size, wrapped over the carton and heat sealed. Maximum power consumption is 2.2 kW. The machine can give 60/120 cartons per minute depending on the size and shape of the cartons. It is suitable for over-wrapping rectangular shaped cartons like those used for toothbrushes, cassettes, blade dispensers, agarbatties, etc. and the types used in pharmaceutical, cosmetic, food and similar industries.

For further information write to: Autopack Machines Pvt Ltd., 101-C Poonam Chambers, 1st Floor, Dr. Annie Besant Road, Worli, Bombay 400 018.

(*Industrial Products Finder Annual 1988, 251*)

21 Rotary sealer

Model RS.16 Automatic Rotary Sealer is designed for sealing inserts and plugs made of LDPE, HDPE, PP, etc., on to bottles of the same material. Bottles are handled through a timing screw and starwheels for smooth movement at high speeds. Temperatures of sealing heads are controlled for effective sealing. The machine can handle bottles of different sizes and shapes and is for leakproof/pilfeproof packing of edible oils, petroleum products, adhesives and variety of products in cosmetics, food, pharmaceutical and pesticide industries. Output of up to 120 bottles/minute is possible.

For further information write to: Autopack Machines Pvt Ltd 101-C Poonam Chambers, Ist Floor, Dr. Annie Besant Road, Worli, Bombay 400 018.

(*Industrial Products Finder Annual 1988, 242*)

22 Powder dosing machine

Autopack manufactures semi-automatic powder dosing machine for accurate filling of powder and granules in containers, bottles, pouches, etc with an accuracy up to ± 1%. Filling capacity ranges from 5 gm to 1 kg. Output is up to 30 fills/min. The machine has an electronic counter for accurate fill and easy adjustment of weight. Special stirring system ensures good deaeration. Power input is 0.75 kW. Fully automatic models with inline coding, cap fixing, etc are also available. The machine is most suitable for filling tooth powder, talcum powder, baby powder, dry syrups, coffee and food, pharmaceutical, chemicals or cosmetic etc in powder form.

For more details write to: Autopack Machines Pvt Ltd, 101-C Poonam Chambers, 1st Floor, Dr. Annie Besant Road, Worli, Bombay 400 018.

(*Chemical Products Finder 7(8), 1989, 92*)

23 Automatic plastic bag making machine

Patel Machinery Pvt Ltd has introduced a fully automatic side sealing and cutting machine capable of making LD/LLDEP/HM-HDPE/PP bags in plain as well as printed. The machine has less number of moving parts compared to that of conventional machines. The colour mark scanner fitted on the machine for registration of printed films is extremely sensitive and capable of detecting very low contrasts in colour. Response time of this photocell is so low that there is practically no difference between the speed of the machine for the plain film and printed film. This new film indexing arrangement has microprocessor which controls draw length to the required size. Draw length can be set easily from the panel controls by a thumbwheel switch. This new feature registers the film in the required draw length, hence there is practically no size variation.

For further information write to: Patel Machinery Pvt Ltd., 5/1/1A Phase 1, GIDC, Vatva, Ahmedabad, Gujarat 382 445. *(Industrial Products Finder 17(2), 1988, 46)*

24 Flexible packaging film for food

Scharr Industries, Inc, manufactures metallized film for packaging food products such as candy, snack foods and coffee. It is said to offer excellent MVTR and O2TR barrier and a light barrier that prevents oxidative rancidity. Its bright foil appearance, high slip, high resistance, and flexibility combine to make it a material that results in attractive laminations.

For further information write to: Scharr Industries, Inc, 40 E, Newberry Road, Bloomfield, Connecticut 06002, U.S.A. *(Industrial Products Finder Annual 1988, 735)*

25 Beer pump

A magnetically coupled beer pump, claimed to be the first of its kind for beverage dispensing, is offered by a British manufacturer. Maggy (magnetically coupled) from Totton Pumps, is said to be leak proof as it eliminates the normal shaft seals which would wear down and eventually leak. It is, therefore, almost maintenance free. The magnetic drive also allows the pump to be made of taint-free plastics so it is ideal for the food trade, dispensing liquids, especially beer and lagers. It also features a constant delivery of between 0 and 9.1 litre/min with only a slight fall-off at 13.6 litre/min. Compactness is another advantage, with overall dimensions at 187 x 165 x 296 mm. The motor is a permanent split-capacitor induction type, with integral sealed gear drive, and the power source can be either 240 or 110 V single-phase 50/60 Hz.

For more details write to: Totton Pumps Ltd., Southampton Road, Cadnam, Southampton SO4 2NF, U.K.

(*Chemical Products Finder* 7(7), 1988, 99)

26 High production slicer/grater

Snack food and cheese processors, as well as bakeries, can get uniform slices, shreds, and granulates with the Urschel Model CC Slicer. Its simple, versatile design enables the processor to change cutting configurations quickly for oval, V-cut, and deep-V slices and shreds. The unit can slice potatoes for chips, shred carrots and cheese for toppings, and granulate nuts and pie crust for bakery goods.

For further information write to: Urschel Laboratories, Inc 2503 Calumet Ave, P.O. Box 2200, Valparaiso, Indiana 46384-2200, U.S.A.

(*Industrial Products Finder Annual* 1988, 595)

27 Improved curd beater

Scientists at the National Dairy Research Institute, Karnal have developed an improved curd beater that churns curd for removing the fat.

The new curd beater is of turbine type, having six blades with vertical disposition. Made of aluminium, it is essentially an improved version of the traditional beaters or 'mathani' used in villages, and retains only the bottom paddle of the original unit.

The new curd beater has been found to be far superior in terms of energy consumption, time requirement for churning and cost advantage.

(PTI Science Service 7(23), 1988, 4)

28 Industrial drying oven

Yorco Air Drying Oven is used for baking breads and biscuits, drying chemicals medicines etc. It is of double walled construction on a heavy angle iron frame. Inner and outer chambers are made of thick mild steel. Inner chamber is coated with aluminium paint and outer is finished with grey hammertone. The 75 - mm gap between the walls is well insulated with glasswool. Temperature is controlled by capillary thermostat from 50°C to 250°C ± 5°C. A heavy duty blower is provided to circulate air inside the chamber. Control panel is fitted on one side with On/Off switch, indicator lamps, and temperature control knob dial thermometer. Adjustable ventilation is provided on top of the roof. The oven is supplied complete with cord and plug to work on 220 V, single phase, or 440 V 3 phase AC supply.

For more details write to: York Scientific Industries, Yorco Chambers, 3A Tak Wadi, Kalbadevi Road, Bombay 400 002.

(Chemical Products Finder 7(7), 1988, 133)

29 Tray dryers

Thermal Airo Electricals offers tray dryers for use in drying foodstuffs. They are available in 12, 24, 48, 96, 150 and 192 tray capacities. Drying is carried out at temperatures from 100°C to 300°C depending upon the type of product to be dried. Trays are made from aluminium sheets, SS or GI. The dimensions are 813 x 406 x 32 mm. Tubular or strip heaters are used in case of electric heating and finned steam coils are used for steam heating. Unform temperature is maintained by using suitably rated fans. A temperature controlling thermostat to control the working temperature automatically is provided.

For more details write to: Thermal Airo Electricals, Plot 90/1, GIDC Estate, Vatva, Gujarat 382 445.
(*Chemical Products Finder* 7(9), 1989, 135)

30 The world's first commercial sonic-assisted drying plant

The world's first commercial-scale sonic-assisted drying facility is undergoing trial and has started commercial production in 1988 at Westco Drying Inc. in Desert Hot Springs, California, USA. The plant custom-dries specially cheese and milk powders, vegetable products, such as onions and garlic, and citrus products for other food processors.

Formerly known as 'pulse-combustion drying' sonic-assisted drying combines heat and acoustics to dry viscous products difficult or impossible to dry via conventional spray drying and dries them at temperatures much cooler than conventional methods to reduce product degradation by heat. Product outlet temperature is as low as 90°F compared to 250°F which is typical for conventional spray drying.

Sonic-assisted drying technology was originally developed jointly by US Development Corporation (USDC), Indianpolis, and Purdue University. Continued development of the process on a pilot plant at Purdue has reduced 'sonic effluent' to below the 80 decibel limit mandated for industrial processes by OSHA regulations in USA.

In pilot test at Purdue, the process has successfully dried products ranging from 8 to 76% solids, reports Dr. Jay Marks, professor of food science at Purdue. The USDC has purchased rights to commercialize and license the technology.

One very positive aspect of the Westco Drying Plant is its cost effectiveness. The use of solar and thermal energy from the desert and the sun allows the plant to generate the same temperatures naturally as a conventional plant does mechanically, thereby reducing operating costs.

The retrofitted plant combines sonic-drying and solar-heating technologies plus dry, hot desert air to cut energy costs and boosts drying efficiencies. Solar heat is collected and routed to the plant by seven miles of stainless steel pipes laid out on the desert floor, and by roof-mounted solar heat collectors.

In addition to commercial production, the Westco plant will serve as a pilot facility for commercial scale up and for tuning the process for drying to the degree needed to meet tight product specifications. For products ordinarily subject to burning or caramelization, the plant can adjust outlet temperature to as low as 90°F. By using the above facility of drying, USDC introduced in 1988, Sweet C 42 - high fructose corn syrup dried via the sonic assisted process and encapsulated to prevent hygroscopicity.

For further information contact: Westco Drying Inc, Desert Hot Springs, California, USA.
(*Chemical Weekly* 34(23), 1989, 81-82)

31 Drying plants

SSP offers the most modern drying plants for dairy, chemical, food processing and pharmaceutical industries based on advanced technology. Their spray dryers incorporating the latest and most efficient spray nozzle design produce instant powder comparable to the best in the world and gives a lot of flexibility in control of powder quality. Through their development efforts they have successfully designed, fabricated and commissioned the largest vibro fluidised bed dryer in India. The continuous band dryer designed by them using indigenous technology has got some unique features. They also offer rotary bundle tube and flash dryers which are latest in design and most efficient in performance. Recent collaboration agreement with Swenson Process Inc. USA, a world leader in dryer technology development would upgrade SSP's own technology. They are revamping their R&D Centre completely and installing pilot plants to try out new products before offering any plant to a customer.

For further information write to: Faridabad Stainless and Steel Products Co. Pvt Ltd., 19 DLF Industrial Area, Phase-II, 13/4 Mathura Road, Faridabad, Haryana 121 003.
(*Industrial Products Finder Annual 1988, 145*)

32 Grain dryer

The Terminal Grain Dryer efficiently dries corn, wheat, soyabeans, rice, and milo. Easily converted between 50 and 60 cycle power, it operates on natural gas and LP with optional gas/oil burners. Designed to cut 30 to 40% from a fuel bill, this dryer used double inlet 3650 airfoil centrifugal fans and has state of the art drying controls. It comes in models with capacities ranging from 19 to 95 T/hr.

For further information write to: QED Dryers Sales and Manufacturing, Inc. 4993, 27th Ave, Rockford, Illinois 61109, U.S.A.
(*Industrial Products Finder 17(2), 1988, 163*)

33 Continuous solid-liquid separation centrifuge

The Pennwalt Super-D-Canter manufactured in collaboration with Sharples Stokes Division, Pennwalt Corporation, USA, is amongst the finest continuous solid-liquid separation centrifuges and embodies the latest improvements that effectively utilise high centrifugal forces in a rotating bowl to achieve an efficient separation. It has a high capacity/power ratio, is exceptionally compact, needs little, if any, maintenance or supervision, and gives continuously an effective and reliable separational performance. The general areas of application of the Pennwalt Super-D-Canter are clarification of liquids; dewatering of solids; and wet classification of very fine solids and dewatering of effluent sludges. It can handle a wide variety of slurries in chemical processing, food processing, minerals and allied industrial effluents.

For further information write to: Pennwalt India Limited., 507 Kakad Chambers, 132, Dr Annie Besant Road, Worli, Bombay 400018.
(*Industrial Products Finder Annual 1988, 2*)

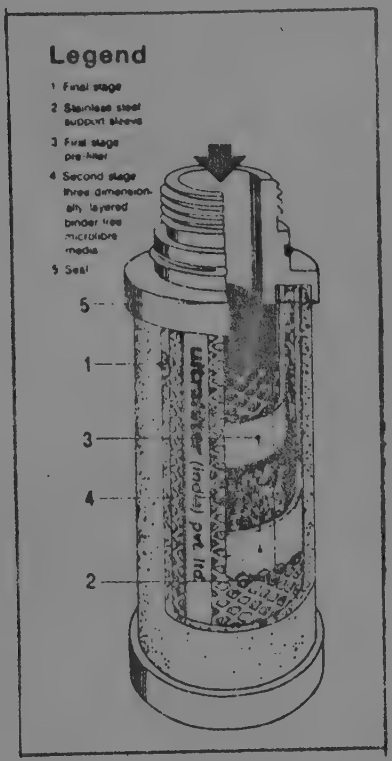
34 Fruit and vegetable sorter

Seven tonnes of potatoes, or similar fruit and vegetable products, can be stored and packed in one hour by an automated system available from Britain. The Autoselector D has been designed to eliminate any human sorting or the need to pre-size items. The system can be programmed to sort and pack fruits and vegetables such as apples, oranges, lemons, tomatoes, sprouts, peppers and onions (and with the manufacturer's conveyor feed system, it can even handle shrimps and prawns). Tubers are fed on to a conveyor where they are rotated while being moved along the belt. Viewed by a television camera and measured by a high speed computer, each item's length, minimum and maximum width and conformity to required shape can be recorded, together with counts, totals and any other information. The system will calculate weight automatically, and as accurately as any individual weight sizer, and will then channel each item separately into six or more designated outlets, according to measurement, weight and acceptability of shape.

For further information write to: Loctronic Graders Ltd., Denbury, Chelmsford, Essex CM3 4NH, U.K.
(*Industrial Products Finder Annual 1988, 195*)

35 Cartridge filters

Ultrafilter (I) Pvt Ltd manufactures, in technical collaboration with Ultrafilter GmbH, a complete range of cartridge filters for the purification of compressed air, gases and liquids. These high efficiency filters, which can trap particles down to 0.01 micron in size, find applications in a wide range of industries - breweries, pharmaceuticals, chemicals, dairies, food processing, etc. Inside this filter, purification takes place in three stages. In the first stage, coarse particles of dirt and pipe scales are trapped by a prefilter as the compressed air flows through the filter element. In the second stage, the partly filtered air is passed over a three-dimensionally layered microfibre medium where 99.99998% of all oil and water aerosols and dirt particles down to size of 0.01 micron separate, forming bulk liquid. This bulk liquid is carried by the air flow into the outer foam sock where, in the third and final stage of filtration, air and bulk liquid separate, with the latter sinking to the bottom of the filter housing from where it is regularly discharged. Vaporised oil and odours are removed by patented two-stage activated carbon filters. In food, beverage and pharmaceutical industries, the air is further passed through a sterile filter to ensure 100% sterility. Ultrafilter liquid filters are used to purify liquids, including process water, parenterals and injectibles, to 0.2 micron particle size.


Legend
1 Final stage
2 Stainless steel support sleeve
3 First stage pre-filter
4 Second stage three dimensionally layered binder free microfibre media
5 Seal
5
1
3
4
2
ultrafilter (india) pvt ltd

For more details write to: Ultrafilter(India) Pvt Ltd., 29/2 KH Road, Bangalore, Karnataka 560 027.

(*Chemical Products Finder* 7(7), 1988, 130)

36 Filter products for food and beverage industry

Ion Exchange (India) Limited offers a wide range of filter products specifically suited for food and beverage industry. They represent Cuno Pacific Pty Ltd., Australia in India for the fine filtration products. Cuno manufactures the widest range of fine filtration equipment available from any one company. The basic filtration methods used by them include: depth, surface and adsorption filtration. Generally the food and beverage industry requires utilisation of all these three methods. Many beverages just require the efficient filtration of particulates from water. Cuno depth filters, BetaPure, Micro Klean III and Micro Wynd II economically service this requirement for the mains incoming water to the manufacturing plant or individual drink dispensing units and ice makers. Should high flow rates be required then the polypropylene pleated BetaFine or Polypro should be used. The Cuno activated carbon cartridges AP117 are used to remove chlorine or offensive tastes and odours from water. In the beverage industry Zeta Plus serves as a replacement to the hazardous asbestos filter media. The filter media is available to fit all filter presses and is also manufactured in cartridge configuration to fit Cuno fully enclosed, no mess sanitary housings. Cuno's Zetapor Nylon 66 beverage membranes are specifically designed to meet the requirements of beverage industry. The cartridge combines long service life with efficient bacteria, mould and yeast removal. Cuno filter media is steam or hot water sterilisable for many cycles to obtain maximum service life.

For further information write to Ion Exchange (India) Ltd., 10, Bengal Chemical Compound, 502, Veer Savarkar Marg, Prabhadevi, Bombay 400 025.

(*Industrial Products Finder Annual 1988, 267*)

37 Meat and sea-foods processing systems

H Maurer + Sohne, West Germany, manufactures a complete range of systems for processing meat and sea foods. Maurer air-conditioned, maturing and smoke house installations can be used, eg. for uncooked sausages, and meat products of any kind; dried sausage and meat products; sausages and meat products with white mould; fish and other sea foods; provisions, delicatessen and fruits.

For further information write to: Thermal Airo Electricals, 90/1, GIDC Estate, Behind Bank of India, Vatva Dist Ahmedabad, Gujarat 382 445.

(*Industrial Products Finder* 17(3), 1988, 26)

38 Various systems for use in food/pharmaceutical/chemical industries

Industrial Dynamics Ltd, USA, manufactures various systems whose application covers industries like food, beverages, soft drinks, cosmetics, pharmaceuticals, chemicals, paints, etc. Empty Bottle Inspection System detects presence of foreign matters, residual liquids, chipped finishes, plugged necks, broken heels and scuffed side walls. This prevents costly product waste, helps eliminate product liability problems and promotes line efficiency. Filler and Closure Monitoring and Sampling System monitors filler operation by pinpointing and reporting the source of improperly filled containers, while cutting filler stoppages to the bare minimum. The system also serves as a maintenance support device that warns of impending machine failure and out-of-tolerance operations. In addition, these systems provide data collection and reporting capabilities of analysis of process problems and trends. Full Package Inspection System: inspects fill level, closure, label placement, container integrity and special package features. This system provides an early warning of defective products for fast correction and can keep improperly filled containers from interrupting production. Case Inspection

System: rejects missing, empty, broken and high packages in closed or open cases. Inspections include leading and trailing flaps, along with protruding side flap inspection. This system's microprocessors delivers production and quality control data as well as self diagnostics for easy maintenance. Hence this systen enhances production efficiency, reduces labour cost, cuts down on pilferages and prevents the distribution of incomplete or defective cases. Rejection System is compatible with high speed inspection equipment and will operate on fixed or variable speed production lines.

For more details write to: Pentax Engineering Pvt Ltd., Bharat Velvet Compound, Safed Pool, Sir MV Road, Andheri (East), Bombay 400 072.
(*Chemical Products Finder* 7(9), 1989, 76)

39 Food processing systems

Stork Titan bv Holland, a part of the worldwide Stork group of companies, manufactures a wide range of Food Processing Systems and Equipment. The range of equipment comprises extremely durable and highly versatile systems for forming, portioning, flouring, battering, breading, tempering and frying, as well as conveying and cooling systems in various capacities for meat, fish, potato and vegetable based convenience foods. Basically these systems cater to the processing of meat, poultry, fish hamburgers, croquettes, snacks, chips, crisps, peanuts and other similar products.

For further information write to: K Pack Systems, 17/B, Horniman Circle, 3rd Floor, Dena Bank Bldg, Bombay 400 001.
(*Industrial Products Finder* 17(4), 1989, 180)

40 Unique bearing material for food processing

Extensive research, development, and testing have produced RULON 641, a new self lubricated bearing material. Made solely from Food and Drug Administration-cleared materials, it is said to be suitable for food, drug, and dairy processing applications.

It is a nonabrasive and compatible with a variety of mating surfaces, including mild steel and types 303 and 316 stainless steel. Featuring a low coefficient of friction, this material was designed to replace brass, bronze, and carbon bearings.

For further information write to: Dixon Industries Corporation, 386 Metacom Ave, Bristol, Rhode Island 02809, U.S.A.
(Industrial Products Finder Annual 1988, 449)

1 Extrusion equipment

Age Technologies Pvt Ltd has introduced a complete range of indigenously developed equipment for snack and pet food extrusion to manufacture various shapes from a range of possible corn/rice/potato/soya based ingredients. The heart of the system is the extruder cooker which employs a unique dry extrusion process, creating heat through pressure and friction. Heat and pressure are used to cook and expand ingredients, gelatinise starch, destroy inhibitors where present and modify or sterilise by-products and dehydrate moist waste materials. With this dry extrusion process, no additional heat source is required as it relates to the extruder function, thus eliminating the capital and operating costs of boilers and driers. Auxiliary equipment is also available to clean and mix raw materials, cool extruded products, apply flavour, and to facilitate material handling.

For more details write to: Age Technologies Pvt Ltd., 712 GIDC, Makarpura, Vadodara, Gujarat 390 010.
(Chemical Products Finder 7(9), 1989, 105)

2 Molecular distillation plants

AVC designs and manufactures molecular high vacuum distillation plants for critical molecular separation requirements in the processing industries. Available in two types, viz, wiped film type and centrifugal molecular type, they are suitable for process vacuum up to 10^{-4}mm and dry vacuum of 10^{-6} mm. The operating principle is as follows. A thin film of the liquid (film thickness 0.01 mm or less) is formed by mechanical means and heat and vacuum are applied simultaneously. The heat exposure time remains less than a minute and the distillation takes place. The evaporated material is condensed with a centralised condenser and collected separately. Typical applications are for heat sensitive products where high level of purity is achieved without affecting the original product characteristics or flavour. The plant is ideal for perfumery and flavour industries, vitamins manufacturing, solvent recovery, food processing, etc. Any highly heat sensitive chemicals can be processed at low temperature and high vacuum. AVC molecular distillation plants are available from 2 LPM lab scale models to 800 LPM industrial models. Larger capacities can be custom engineered for specific applications. Materials of construction include SS 304 and 316, titanium, tantalum, and Hastelloy. AVC offers specialised technology for high vacuum processing.

For further information write to: Atomic Vacuum Company, Post Box 8332, Deonar, Bombay 400 088.

(*Industrial Products Finder* 17(2), 1988, 48)

43 Tapioca peeler

The Tamil Nadu Agricultural University has developed a machine for peeling the cork layer of tapioca tubers. Developed by the post harvest technology scheme of the department of agricultural processing, college of agricultural engineering, the power driven machine consists of a rotor of 25 cm diameter and 30 cm in length. Cutting blades have been mounted along the circumference of the rotor with a blade angle of 50 degrees.

Driven by a one HP electric motor it peels nine quintals of tubers in hour. Peeling efficiency is 85 per cent and starch loss is 4.5 per cent. The cost of peeling works out to Rs. 1.50 a quintal as against Rs. 12 by the conventional manual method. The cost of the unit is Rs. 3,500.

(*The Economic Times* 20 January 1989, 10)

4 Cherry pitter

An Indian manufacturer of food processing equipment and machinery offers a manual cherry pitter. The machine from Gardeners Corporation has a capacity of 50-60 kg per hour. It is priced at USD 480 per unit.

It has exported to African countries, Bangladesh, Burma, Mauritius and Nepal.

For further information, contact: S. Narang, Partner,
Gardens Corporation, 6, Doctor's Lane, Post Box No. 299,
New Delhi 110 001. India.

(Indian Food Packer 42(5), 1988, 62)

5 Pre heating tanks

An Indian Company offers a tank used for pre-heating liquids in the food processing industry. It has a capacity of 66 litres. Manufactured by Gardners Corporation, the tank comes in two models, one that is electrically-heated and the other, steam-heated.

It is rectangular and made of heavy guage mild steel in welded construction. It is painted with heat-resistant enamel. The electrically-heated tank is provided with a thermostat, drain socket, short legs, water inlet and overflow sockets and is insulated with glass wool from outside.

The electrically-heated tank costs about USD 700 per unit. The steam-heated tank without insulation costs about USD 502 .

(Indian Food Packer 42(5), 1988, 62)

PACKAGING

46 Corrugated boxes from cotton stalks.

Cotton stalks are emerging as a non-conventional raw material for the manufacture of corrugated boxes used in the packaging of fruits and vegetables.

Wooden boxes and corrugated cartons have been found to be the most suitable for packaging of fruits and vegetables, especially in terms of storability and suitability for long-term transportation. They minimise ripening loss in weight and decay of the packed products, thereby substantially reducing post-harvest losses of fruits and vegetables, which have been estimated to be Rs 20 million annually.

Between the two, corrugated boxes are a better packaging medium, especially because of their light weight, but their use is inhibited by the high cost of manufacture. The Cotton Technological Research Laboratory, Bombay has now evolved a cheap method for making corrugated boxes of various dimensions from cotton plant stalks.

An estimated 15 million tonnes of cotton plant stalks are generated annually in the country. At present, they are not used for any commercial purpose, except as a fuel by rural people, while a bulk of it is disposed off by burning in the fields.

Dry cotton plant stalk was mechanically cut into small chips, 2 to 3 cms in size, and soda and kraft pays prepared from them using 14 per cent sodium hydroxide and 16 per cent kraft paper liquor (sodium hydroxide and sodium sulphide). The pulps were then used to prepare large-sized hand-made paper which was in turn used to make corrugated boards and boxes.

The cost of manufacture of these corrugated boxes will be lesser than that of boxes made from the raw materials, as the cotton stalk is a renewable resource, which is grown every year and available in plenty at a very low price. The use

of cotton plant stalks as a raw material would also entitle manufacturers of the excise rebate which is given to industries using agro wastes, the report says.
(P.T.I. Science Service 8(1), 1989, 3)

47 Easy-to-open retortable container know-how to U.S.

Idemitsu Petrochemical Co. has licensed the know-how on manufacture of its easily peelable plastic retortable container ("Magictop") for foodstuffs to Sonoco Products Co. (U.S.). The agreement provides the U.S. firm with nonexclusive rights for use of the know-how in North America (U.S., Canada and Mexico).

The Magictop container is said to satisfy the conflicting requirements for retortable food containers -- one is the tight sealing that can withstand application of high temperature for sterilization of the contents obliged under the law and the other is ease of opening the container when taking the contents therefrom. How to cope with these incompatible requirements has been a problem for the world's makers of retortable plastic food containers.

Idemitsu achieved a breakthrough in 1986 through successful combination of its own technology for making peelable multilayer plastic sheets and its technique for producing an appropriate notch on the flange of a container.
(Chemical Weekly 34(20), 1989, 111)

48 Plan to make jute boxes for packing fruits

A specific plan is to be drawn up for the commercial manufacture of jute boxes of packing apples and other fruits instead of the traditional plywood chests. This is being done as the response from apple growing states like Jammu and Kashmir, Himachal Pradesh and Uttar Pradesh, which carried out experiments with jute boxes has been encouraging.

A meeting comprising laminators, who are manufacturing plywood boxes, manufacturers of cardboard boxes located around Delhi and Calcutta was held in Delhi on October 14.

Representatives of the Indian Institute of Packaging, Indian Jute Research Association and Jute Manufactures Development Council attended the meeting and explained technical details to manufacturers of plywood chests and cardboard.

The aim of this meeting was to increase the use of jute boxes for packing apples and other fruits to save wood.

Under the internal marketing assistance scheme, entrepreneurs showing interest in commercial manufacturing and marketing of jute boxes will be given subsidy for a period of three years to popularise these boxes in fruit growing states.

Interestingly, Bhadrachalam Paper Board Ltd., located in Andhra Pradesh, has shown interest in utilising raw jute and jute sticks for converting into high grade quality paper and its bags. It has urged the ministry of textiles to give concessions and financial refliefs as are given to sugar mills which supply bagasse to the paper industry.

In view of the scarce forest resources, the ministry of textiles has been exploring the possibility of switching over to jute bags for packing apples and other fruits. Its efforts are yielding encouraging results as interest has been shown by apple producing states in using jute boxes instead of plywood chests. The market subsidy to be given for three years is expected to enthuse entrepreneurs to manufacture jute boxes, official sources say.

(*Beverage and Food World* 15(4), 1988, 68,70)

49 Electronic fruit

They aren't edible and never will be, but they exist to ensure that the fruit and vegetables that you do eat are the best quality possible.

The electronic fruit were developed by engineers Bernie Tennes and Roland Zapp of Michigan State University.

The American imitation, is an 8 cm sphere of beeswax, containing a tiny clock, an accelerometer, a microprocessor and a battery. The accelerometer records the severity of the bumps which a small fruit, such as an apple, sustains on its journey from tree to shelf. The microprocessor records those bumps which were severe enough to cause a bruise, while the clock notes the time of occurrence. The data recorded in the ersatz fruit is fed into a computer for study.

Tennes and Zapp, in collaboration with the US Department of Agriculture, tested four electronic fruits on 15 apple grading and packing lines, where the fruits were washed, waxed, dried, sorted and bagged, within just 10 to 15 minutes. The fake fruit helped pin-point the exact stages at which the real apples were likely to be damaged. This information was used to improve the machinery used in processing lines. Padded conveyor belts, additional ramps and modified drop heights helped reduce the damage caused.

In another study, the electronic imitation was packed with real apples and test driven 48 to 580 km to test how effectively various packing materials protected the apples during transportation. The cell pack, a foam container housing each apple in an individual compartment, proved to be the best. An improved electronic fruit, incorporating a temperature-sensing device is planned.

(Science Today December 1988, 29-30)

ANALYSIS

50 Liquid sampler

The accurate, automatic sampler from Sonford Samplers, USA, can monitor composition of various liquids, including water, effluent, foods and beverages, pharmaceuticals, chemicals, paints, and petroleum products. The air operated sampler arms take representative samples for analysis. Continuous flow in resevoir keeps the solids suspended to give true composite samples. Programmable microprocessor operates the sampler without supervision. The samples can be obtained at preset times or by proportion to flow. In the sampling cycle sampler arm extends into liquid, retracts, and empties cup contents into funnel to refrigerated storage compartment. The arm can hold various sizes and styles of cups for different sampling requirements.

For further information write to: Sonford Samplers, 905 N 5th Street, Minneapolis, MN 55401, U.S.A.

(Industrial Products Finder Annual 1988, 365)

COMMERCIAL INTELLIGENCE

PRODUCTION (Raw Material)

51 All-India final estimate of production 1986-87

Production in '000 tonnes

	Potato	Onion	Sweet Potato	Tapioca	Banana
1	2	3	4	5	6
Andhra Pradesh	1.3	147.0	16.7	15.2	356.5
Assam	337.7	11.4	28.6	7.5	391.4
Bihar	1334.5	126.8	330.0	-	59.6
Gujarat	253.6	477.7	20.8	-	546.2
Haryana	131.5	43.3	4.1	-	-
Himachal Pradesh	37.8	0.8	-	-	-
Jammu & Kashmir	3.1	0.8	-	-	-
Karnataka	222.7	183.6	46.6	14.6	94.0
Kerala	-	1.6	40.3	2576.1	328.8
Madhya Pradesh	333.7	151.3	39.5	-	197.9
Maharashtra	51.9	600.2	79.5	-	1379.3
Manipur	20.9	-	0.3	-	29.2
Meghalaya	149.5	-	12.7	23.6	52.4
Nagaland	6.8	0.2	0.5	0.6	-
Orissa	96.7	382.1	443.7	-	194.2
Punjab	251.5	27.6	2.2	-	-
Rajasthan	9.8	57.0	2.6	0.5	-
Sikkim	26.4	-	-	-	-
Tamil Nadu	98.6	158.2	16.2	913.6	911.6

Contd...

1	2	3	4	5	6
Tripura	40.2	0.2	13.0	2.2	19.9
Uttar Pradesh	5757.9	349.1	350.8	-	9.9
West Bengal	3542.6	-	-	-	-
Arunachal Pradesh	20.7	-	1.4	10.0	7.2
Mizoram	0.8	-	2.1	0.5	6.0
Delhi	1.2	0.5	0.1	-	-
Pondicherry	-	0.2	0.4	9.8	3.4
Andaman & Nicobar Islands	-	-	0.8	0.7	17.6
Lakshadweep					2.6
All-India	12731.4	2719.6	1452.9	3574.9	4607.7

(Agricultural Situation in India, June 1988, 267-270)

12 All India final estimate of coconut production, 1986-87

(Production in Million / nuts)

Andhra Pradesh	198.8
Assam	54.3
Goa	106.3
Karnataka	1,072.4
Kerala	3,068.0
Maharashtra	81.2
Orissa	134.9
Tamil Nadu	1,423.3
Tripura	2.1
West Bengal	186.6
Andaman & Nicobar Islands	33.8
Lakshadweep	24.6
Pondicherry	18.1
All India	6,404.4

(Agricultural Situation in India June 1988, 270)

53 All India final estimate of oilseeds production, 1986-87

(Production in '000 tonnes)

	Groundnut	Sesamum	Rapeseed & Mustard	Niger-seed	Safflower	Sun-flower	Soybean
Andhra Pradesh	1,346.4	28.5	0.3	3.7	9.7	28.7	–
Assam	–	6.9	149.0	–	–	–	–
Bihar	4.9	6.8	57.3	13.5	0.2	0.1	–
Gujarat	1,291.7	12.4	234.9	–	–	–	6.0
Haryana	7.8	2.4	216.0	–	–	–	–
Himachal Pradesh	0.4	1.7	1.1	–	–	–	0.1
Jammu & Kashmir	1.4	6.9	54.0	–	–	–	–
Karnataka	894.0	40.0	1.1	9.3	123.0	309.0	–
Kerala	6.1	3.3	–	–	–	–	–
Madhya Pradesh	192.0	20.7	202.0	32.1	0.3	–	645.5
Maharashtra	435.2	49.3	1.0	10.8	197.5	83.6	–
Manipur	–	0.2	2.7	–	–	–	–
Meghalaya	–	0.6	4.5	–	–	–	0.8
Nagaland	0.7	0.8	8.9	–	–	–	0.6
Orissa	496.0	134.5	64.4	60.5	1.9	0.3	–
Punjab	42.0	5.8	118.0	–	–	–	–
Rajasthan	130.5	7.0	691.3	–	–	0.4	39.2
Sikkim	–	–	5.4	–	–	–	6.0
Tamil Nadu	1,077.7	36.1	0.1	–	–	16.9	–
Tripura	0.8	1.0	2.4	–	–	–	–
Uttar Pradesh	112.8	13.8	629.5	–	–	1.9	135.5
West Bengal	14.3	62.5	176.9	2.1	–	0.8	0.3
Arunachal Pradesh	–	0.4	13.8	–	–	–	1.3
Delhi	–	–	0.2	–	–	–	–
Mizoram	–	1.4	–	–	–	–	–
Pondicherry	4.8	0.2	–	–	–	–	–
Dadra & Nagar Haveli	–	–	–	0.1	–	–	–
All-India	6,059.5	443.2	2,634.8	132.1	332.6	435.7	835.3

(*Agricultural Situation in India*, May 1988, 186-192)

All India final estimate of spices production 1986-87

(Production in '000 tonnes)

	Cardamom	Coriander	Black pepper	Ginger	Chillies	Garlic	Turmeric
Andhra Pradesh	-	23.6	-	3.26	293.1	2.0	127.4
Assam	-	-	-	-	6.5	-	5.4
Bihar	-	3.4	-	0.84	9.3	5.7	6.9
Gujarat	-	-	-	0.44	10.8	13.4	-
Haryana	-	0.1	-	-	12.1	10.4	-
Himachal Pradesh	-	-	-	0.85	0.1	-	-
Jammu & Kashmir	-	-	-	-	0.5	0.1	-
Karnataka	1.62	2.3	0.67	2.92	176.6	2.0	18.5
Kerala	3.09	-	31.94	43.60	0.9	-	6.2
Madhya Pradesh	-	10.9	-	4.10	11.0	58.0	0.4
Maharashtra	-	-	-	0.54	68.4	29.6	9.1
Manipur	-	-	-	0.83	2.1	-	-
Meghalaya	-	-	-	23.35	1.1	-	1.6
Nagaland	-	-	-	2.85	0.2	0.6	-
Orissa	-	8.4	-	6.86	63.4	56.5	27.7
Punjab	-	-	-	-	9.0	2.8	-
Rajasthan	-	102.4	-	0.51	31.8	3.3	0.4
Sikkim	3.90	-	-	10.90	-	-	-
Tamil Nadu	0.54	13.7	0.23	1.07	32.2	1.7	64.6
Tripura	-	-	-	1.18	0.7	-	1.7
Uttar Pradesh	-	2.2	-	5.79	19.6	19.9	0.6
West Bengal	0.58	-	-	7.02	26.4	-	9.6
Arunachal Pradesh	-	-	-	3.60	0.7	-	0.5
Delhi	-	-	-	-	0.2	-	-
Mizoram	-	-	-	6.49	3.2	-	-
Pondicherry	-	-	0.01	-	0.1	-	-
All India	9.73	167.0	32.85	127.00	780.00	206.0	280.6

(*Agricultural Situation in India*, June 1988, 273-276)

EXPORTS

New export norms for bajra and jowar

The public notice relating to the export was issued by the Chief Controller of Imports and Exports on December 1. Under the special procedure, the ceiling for export of bajra and jowar will be placed at the disposal of the Agricultural and Processed Food Products Export Development Authority (APEDA).

Exports will be allowed on the basis of first come, first served basis against the contracts backed by 100 per cent irrevokable letter of credit. Exporters while applying to APEDA would also submit a bank guarantee equivalent to one per cent of the FOB value as per irrevokable letter of credit.
(Economic & Commercial News 18(53), 1988, 9)

56 Molasses exports to be allowed in 1989-90

The government would permit export of molasses and alcohol in the next financial year also in view of their surplus position. Union industry minister J. Vengala Rao announced here today, reports UNI.

He said foreign exchange earnings from export of these items was likely to exceed Rs. 50 crores next year.

The quantities to be permitted for export would depend on surplusses to be indicated by various states.

The government has authorised export of ten lakh tonnes of molasses and one lakh tonnes of alcohol in the current financial year. However, the actual exports so far had been only 7000 tonnes of alcohol and 50,000 tonnes of molasses, he pointed out. He hoped that exports would be stepped up in the coming months.

Mr Rao said another problem faced by this sector is the poor lifting of both molasses and alcohol by the deficit states, based on allocations made by the industry ministry.

Highlighting the problem created by the surplus states unwilling to allot these to deficit states for distillation, Mr. Rao urged Uttar Pradesh and other surplus states to offer their surplus stocks freely for all purposes and assured that the Centre would make the allocations to the deficit states based on their needs.
(The Economic Times 3 February 1989, 1, 6)

Sesame seed export allowed

The Union government has allowed export of sesame seed under the open general licence (OGL), subject to registration of contracts with the Indian Oils and Produce Exporters Association (IOPFA).

This is the first time in more than a decade that the private trade has been allowed to export sesame seed from the country.

The sesame seed production in the country during the year 1988-8 oil year is estimated at around 6,00,000 tonnes (4,00,000 tonnes kharif and 2,00,000 tonnes rabi) against 3,00,000 tonnes for the last season.

IOPEA has made a detailed study on the export possibilities for various oilseeds and has identified Japan as a major market, followed by the US, West Europe and Middle East countries, Singapore and Hong Kong. Japan imports around 1,00,000 tonnes of sesame seed annually. China is a major competitor in the market.

(Economic and Commercial News 18(48), 1988, 8)

Processed food exports: Thrust areas spotted

The PHD Chamber of Commerce and industry (PHDCCI) has identified a number of thrust areas to achieve a near 40 per cent export growth per annum in processed food and agro-based products over the next three-four years.

The thrust areas identified are meat, eggs (poultry), milk-based products, honey, herbal products, flowers, rice (basmati and non-basmati), alcoholic and other beverages, vegetables, fruits, pickles and papad.

Describing the Government stipulation of zero waste of imported packaging material as an impracticable situation, Mr. Sabharwal has called upon the authorities to incorporate a provision for permitting wastages in the use of packaging material. This is in view of some wastage in any process of manufacture which is bound to occur, according to Mr. Sabharwal.

He has also asked the Government to allow duty-free import of packaging material as well as machinery to enable Indian Exporters meet the international standards of packaging, which is a crucial element in marketing. In this regard, he has pleaded that the provision of duty-free Rep. licences should be restored.

The chamber has stressed on the need for expansion and addition of air cargo space as exporters inconvenienced due to inadequate cargo space in the national carriers.

(*Financial Express* 5 January 1989, 5)

59 Marine products to be exported in value-added form to US

For the first time Indian marine products are to be priced in value-added forms in India itself for marketing in the United States as per an agreement reached by a leading US importer with two Indian seafood firms reports PTI.

The US firm, Shore Group, a leading importer of Indian marine products and the two Indian sea food exporting firms, Chemmeens and Rubien, based in Cochin have formed a consortium for the purpose which would very soon start production of value added products for export to the US.

Under the agreement, the whole marketing investment for these products in the US would be made by the US firm which had also plans to start joint ventures with Indian companies for processing and packaging of marine products in value-added forms, Mr.Noel Blackman, president and director of the Shore Group told PTI here today.

Mr. Blackman said at present Indian marine products were being imported to the US in bulk and the entire retail packaging was being done in the US. "The products thus marketed in the US never bear the name of India and the US consumers never come to know that the products are from India", he said.

He said the very purpose of the consortium was to give a boost to Indian seafood products in the US. Indian products would be marketed as products of India once the consortium started its operations.

He said Indian seafood items were of very high quality and it would fetch a very high price if exported in value-added forms rather than in bulk.

Mr. Blackman said in two years time the consortium would be expanded by involving at least 20 more Indian exporters in different parts of the country.

(*The Economic Times* 16 February 1989, 1)

Japan shrimp market

India will have to soon write off Japan as the major importer of its marine products, specially shrimps.

Going by the trend noticed in recent years, the country may, over the next decade, figure nowhere in the Japanese market which it dominated for long. It has been steadily pushed out by countries like Taiwan, China, Indonesia, the Phillippines and Thailand.

It is learnt that the Marinc Products Export Development Authority (MPEDA) has projected India's share in the Japanese market to fall well below 10 per cent in 1990. It was as high as 35 per cent till not long ago.

This does not mean that Japan is importing less shrimp these days. Far from it, Imports have gone up from 1.51 lakh tonnes in 1982 to 2.8 lakh tonnes last year. It is just that Indian exports have fallen into the trough in the meantime, from 40,000 tonnes in 1982 to 32,000 tonnes in 1988.

All along the other countries have been adding considerably to their share of the market, banking on their 'cultured shrimps'. In the forefront is Taiwan which logged 35,000 tonnes in 1988 against less than a thousand tonnes seven years ago. China did it from the proverbial 'scratch' to 30,000 tonnes over the same period. The Philippines, Indonesia and Thailand have also been not far behind.

On the other hand, India's export of cultured shrimps to Japan has been stagnating around mere 3000 tonnes. This is the main factor that has affected India's competitiveness in the market vis-a-vis other countries.

(*Financial Express* 7 January 1989, 1)

IMPORTS

61 Import of cloves removed from OGL

The Ministry of Commerce, in a recent modification, had decided that cloves and cinnamon/cassia which were so far allowed for import by all persons under Open General Licence (OGL) for stock and sale purposes, will now be permitted for import only against licences. The licences will be granted to all those who have imported these items during the current year or in any of the last five years. Actual users who have no past imports will also be eligible for licence. Applications for grant of import licence are to be made to the licensing authority concerned.

(Economic and Commercial News 18(51), 1988, 13)

TRADE INFORMATION

62 Saffron output

About 5,000 kg of saffron worth Rs. eight crores has been produced in the Kashmir Valley during the current year, an official release said, reports PTI.

Due to its increasing demand, its cultivation has been extended to many parts of the valley including Badgam, Lar, Kultilbagh and Tappar.

(The Economic Times 4 December 1988, 8)

63 Food processing co-ops planned in rural areas

Co-operatives will be formed in rural areas for collection of raw materials for food processing industries. This will effect a direct link between the producer and the processor.

This was disclosed here today by Mr P. Murari, who relinquished the charge of secretary in the food processing ministry to take over as secretary in the ministry for information and broadcasting, while inaugurating a workshop on post-harvest technology of fruits and vegetables organised by the Indian Agricultural Institute.

Mr. Murari said that the ministry for food processing industries had interacted with state government and each state government was identifying a nodal agency for development of horticulture.

He said that regarding post-harvest technology, the country faced numerous problems like transport, storage and handling. The problem was compounded by the inadequacy of a network of rural link roads to permit transportation of crops from the growing areas to the consuming centres, lack of linkages between the grower and the industry, the abiquitous presence of the middleman in the shape of the loan shark which provided the monetary and other inputs, the commission agents who wanted to make a fast without any investment.

Mr. Murari laid stress on utilisation of waste products from the food processing industry. He said that many items now considered waste products had major utility value. It is also worth examining whether we can produce cattlefeed from such waste, he said.
(The Economic Times 21 February 1989, 4)

Priority status for food processing industry

The food processing industry today got a boost with the Government including it and packaging for this industry under Appendix of the Industrial Policy Statement and bringing the fruit and vegetable products and other processed foods under the broadbanding scheme.

Inclusion in Appendix 1 implies priority status and the industry is open to MRTP firms. Milk foods, malted foods and flour industry and items reserved for small scale sector will however, not come under this.

The official notification stated that all food processing industries other than milk foods, malted foods and flour, but excluding the items reserved for the small-scale sector and all items of packaging for food processing industries, excluding items reserved for the small-scale sector, have been included in the list of Appendix 1 industries.
(The Hindu 29 December 1988, 7)

65 Milk products licenses issued

The government has issued 13 letters of intent to public cooperative sector units under the new guidelines for the manufacture of milk products and malted milk products.

Mr. Jagdish Tytler, Union minister for food processing industries, said that the new guidelines have been accorded the highest priority to cooperative and public sectors for future installation of capacity.
(The Economic Times 16 February 1989, 7)

66 Industrial R&D expenditure 'inadequate'

The total research and development (R and D) expenditure in the industrial sector at 19 per cent of the national R and D expenditure is inadequate and has not made any significant contribution in raising the level of productivity.

In a study undertaken by the Federation of Indian Chambers of Commerce and Industry (FICCI) on "productivity, technology and research and development," it is maintained that whatever insignificant productivity increases recorded in certain segments of the society was mainly due to technology upgradation through imports of machinery and equipment.

The FICCI study points out that the share of private sector in the total industrial R and D declined marginally from 57.7 per cent in 1984-85 to 57.3 per cent in 1986-87. Over the same period public and joint sector share increased from 42.3 per cent to 42.7 per cent. In absolute terms, in 1986-87, the public sector has spent Rs. 237.06 crores in R and D against Rs. 198.62 crores in 1985-86. The private sector's expenditure grew from Rs. 251.94 crores in 1985-86 to Rs. 318.11 crores in 1986-87.

According to the study, expenditure on R and D and other related science and technology activities as a percentage of the gross national product has risen from 0.96 per cent in 1985-86 to 1.10 per cent in 1986-87.

This, according to FICCI, is insignificant in comparison to ratios of R and D to GNP in countries like the US, Japan, France, Italy and others where it is over two per cent.
(Financial Express 14 December 1988, 12)

67 Vanaspati price control goes

The vanaspati price control will be off from December 1, 1988 following the government decision to stop supply of imported oil at concessional rate to vanaspati industry.

The agreement for voluntary price control on vanaspati was reached between the government and the industry in August 1987 under which the industry was asked to supply its product at a maximum rate of Rs. 335 per tin of 15 kg. The price was revised upward to Rs 350 a few months ago when the oil supply at concessional rate was reduced to 40 per cent.

At present, the government was supplying 40 per cent of the industry's oil requirement at a concessional price of Rs. 15,000 per tonne, while the industry had an option to meet its another 40 per cent need at an open window rate of Rs. 19,000 per tonne. Now, the government has decided to stop concessional supply fully with a view to reduce dependance on oil imports in view of the expectation of a bumper oilseeds production in the country.

The vanaspati production had gone up substantially to around 10 lakh tonnes during 1987-88 oil year as a result of assured oil supplies at fixed prices, and the demand was also good in view of the higher market prices of edible oils. Now the demand for vanaspati, is expected to shrink.

(The Economic Times 1 December 1988, 1)

68 Domestic expeller oils for vanaspati

Use of indigenous expeller oils of groundnut, mustard and sesame, for the manufacture of vanaspati, has been permitted, subject to a ceiling of 20 per cent.

This major change in the policy has been effective from January 7, official sources said.

Use of expeller groundnut oil is being permitted for the manufacture of vanaspati, for the first time this decade. The ban of the use of expeller and solvent refined groundnut oil was imposed in 1977-78.

The policy has been changed as the oilseeds crop has been very good this year.

(Financial Express 11 January 1989, 1)

69 Cashew bodies sign MoU

A memorandum of understanding (MoU) for close cooperation was signed here on Friday among Cashew Corporation of India (A subsidiary of the State Trading Corporation of India Limited) and Kerala State Cashew Development Corporation (KSCDC) and the Kerala State Cashew Workers' Apex Industrial Co-operative Society Limited (Capex).

The MoU envisaged close coordination between CCI and the two state government organisations. CCI will provide foreign market intelligence on cashew kernels to KSCDC and Capex with the help of STO's net-work of offices in foreign countries, according to an official press release here.

(*The Economic Times* 8 January 1989, 10)

70 Fresh capacity for beer allowed

The Government today announced its decision to permit creation of fresh capacity for the manufacture of beer.

An official release said today that the Government took the decision after reviewing its licensing policy in this respect.

The release said that the Government had banned the creation of additional capacity or expansion of existing capacities for distillation or brewing of alcoholic drinks, except in 100 per cent export oriented units, following the introduction of prohibition in the States.

Licences will be considered subject to the following conditions:

1. No licence will be granted to MRTP/FERA companies for creation of new capacities or for substantial expansion of existing capacities, unless the undertaking assumes the prescribed export obligation.
2. Each unit will be licensed for a minimum capacity of 50,000 kilo litres per annum.
3. There will be no recourse to public financial institution for implementation of the project.
4. The undertaking will not be located in tribal areas and,
5. As far as possible, new units will be dispersed amongst the different regions of the country.

The government reviewed its earlier licensing policy and decided to permit creation of fresh capacity for the manufacture of beer, the release said.

The government reviewed its earlier licensing policy and decided to permit creation of fresh capacity for the manufacture of beer, the release said.
(Financial Express 15 February 1989, 1)

FOOD REGULATION, QUALITY CONTROL AND HYGIENE

Clarification on weaning foods

Cereal or vegetable-based weaning foods containing less than 50 per cent milk solids by weight will be regarded as 'other processed foods' and not under the broadband of "all milk products expect infant milk food (Baby food)".

In a clarification, an official release said that 'weaning foods' for the purpose of broadbanding are those milk food containing more than 50 per cent milk solids by weight.
(Financial Express 28 February 1989, 11)

Treated supari is not a fruit product

Treated supari (betel-nut) is not a "fruit-product" within the meaning of Clause (F) Rule 29 of the Prevention of Food Adulteration Rules, 1955, the Supreme Court has held, reports Unifin.

"If 'supari' did not admit itself of being classified under 'fruit products' or under 'flavouring agents' under Rule 29(F) or Rule 29(M) respectively of the rules, the use in 'supari' of even coal tar food colours permitted under Rule 28 would amount to adulteration", the court added.
(The Economic Times 10 February 1989, 3)

73 EEC curbs nitrates

The European commission has agreed on plans that will have a significant impact on the use of nitrate fertilizers in Northern Europe. The move is an attempt to curb the build up of nitrate levels in water throughout the community.

If the commission's proposed directive is accepted, states will be obliged to devise specific programmes to combat areas where nitrates cause pollution.

Countries will have to set limits for chemical fertilizers, accounting for existing levels of nitrogen, the soil condition and the nitrogen take up rate of the particular crop.

The use of nitrate fertilizers or animal manure on waterlogged, flooded or frozen ground would also be controlled.

(*Chemical Weekly* 34(23), 1989, 105)

74 Salt controls high blood pressure

The Moscow Food Institute of the USSR Academy of Medical Science has prepared a unique salt in which part of the sodium is substituted by potassium and-to some extent-by magnesium. Both potassium and magnesium are good for cardiac activity. The new product has almost the same taste as ordinary table sat. Two kinds of the new salt are under development - one for everyday use and one for medical purposes.

(*Invention Intelligence* 24(1), 1989, 17)

75 Guar gum lowers lipid levels

Guar gum, obtained from the beans of legume Cyamposis tetragonoloba, lowers lipid levels in the blood serum and liver, studies by Indian researchers indicate.

Scientists at the Central Drug Research Institute, Lucknow, studied the effect of different parts of the guar plant, the gum, seeds and splits, on the serum and liver lipids in rats and rabbits.

Group II received guar gum dissolved in water, Group III was given soaked guar seeds and Group IV guar splits in their diet. The lipid levels in the animals were increased through administration of triton, or ethanol or dietary fats.

In normal animals, guar gum (Group II) led to 48.3 per cent and 70.2 per cent lowering of serum triglycerides and liver cholestrol respectively, but the fall in serum cholestrol and total liver lipids was not significant. While guar seeds (Group III) significantly reduced only the serum triglycerides by 32.5 per cent, guar splits did not induce any serum triglycerides and total liver lipids.

The researchers have concluded that guar gum has a "definite hypolipidemic effect which is confined only to the gum of the plant and not other components".
(*P.T.I. Science Service* 8(1), 1989, 4)

Fruit that gives eternal youth

A detailed scientific study has been launched on a little known plant whose fruits are eaten by "Kani" tribals of the Agasthyar hills of Kerala to get "instant stamina, health, vitality and eternal youth".

Scientists of the Postgraduate Research Centre in Ayurveda at Trivandrum said the tonic effect of the plant was comparable to that of the famous Chinese herb ginseng and the plant may be the divine Varahi, dew described by Sushruta in his classing ayurvedic text".

The plant, which the Kani folks call "Arogyappacha", had been identified by botanists as "Trichopus zeylanicus." Its winged fruit has a leathery skin and a triangular shape.

Kani men could live for days without food and still remain energetic by eating few fruits of this plant daily, the scientists said in a report published in "Ancient Science of Life", a journal devoted to ayurveda.
(*P.T.I. Science Service* 7(22), 1988, 1)

77 Nisin preparation (NP) earns GRAS status

Nisin is a polypeptide produced through milk fermentation. It is named after the lactic acid bacteria (Streptococus lactis group N). Nisin is used in processed cheese to inhibit the outgrowth of Clostaidium botulinum spores and toxin's formation in pasteurized cheese spreads.

The petition for GRAS (Generally Recognized As Safe) was submitted to FDA (USA) by British manufacturer Aplin and Barrett. The petition was accepted last June, and FDA issued a GRAS status to Nisin Preparation (NP). The FDA stated at the time of granting the GRAS status that the Nisin should be used at levels consistent with Food Manufacturing Practices. According to British Standards Institution Methods, that level is a maximum of 250 ppm in the finished product.

(*Chemical Weekly* 34(23), 1989, 81)

78 Test for salmonella kit

Poultry farmers worried about salmonella in their flocks can now buy a kit to test for environmental contamination by the bacteria. The kit, produced by Medical Wire and Equipment in Bath, can detect the bacteria in just six hours, if more than 10 000 of the organisms are present in the sample.

The salmonella detection kit contains swabs to collect the sample and tubes of a nutrient broth that encourages the growth of salmonella but suppresses other bacteria. If after six hours at 37°C the broth changes from red to a yellowish green, salmonella is probably present. The final test involves mixing a drop of the broth with a latex suspension coated with antibodies to salmonella If visible clots form within a minute, the test is positive.

The kit, which costs Ł 45 for 25 tests, cannot distinguish between different species of salmonella, and will miss low levels of contamination. The manufacturers recommend incubating the tubes of broth for 24 hours before deeming the sample negative.

(*New Scientist* No.1644/1645, 1988, 29)

79 Waterproofing coatings

Polydee-11 (Food Grade waterproof coating):It is a clear, two components system waterproofing and corrosion resistant coating. It can be safely used in drinking water tanks and for coating in food and pharmaceutical industries. It can replace Polydee-10 and can be given any desired colour whereas Polydee-10 has only black colour.

(*Chemical Weekly* 34(21), 1989, 75)

Food safety laboratory faces closure

The British government's only research centre specialising in the safety of techniques for processing meat and meat products could face closure as part of cuts in agricultural research.

The centre, based in Bristol, is part of the government's Institute of Food Research. It assesses the safety of new packaging, storage and cooking techniques for meat and meat products. According to its head of microbiology, Terry Roberts, the centre's work is particularly important now as the food industry introduces new techniques.

"In the past, the philosophy was to cook food hard until all the bugs were killed. Now, the food industry is introducing new, more marginal methods such as vacuum cooking, industrial microwaving and cook-chill techniques".

Roger Starr of the Institution of Professional Civil Servants which represents the scientific staff at the centre, warned that closure would 'erode' Britain's capacity to respond to problems of food safety.

(*New Scientist* No.1649, 28 January 1989, 25)

Irradiation of sea food and spices

The Minister of State for Science and Technology Shri K.R. Narayanan in a press release said here that the Government has decided to permit the use of irradiation for sterilising sea foods and spices meant for export after the Atomic energy(control of irradiation food) rules 1988 are notified.

The sterilisation process involves selective destruction of spoilage bacteria whereby acceptability and marketability of iced fish is extended by giving moderate doses of about 200 kilorads of radiation. This is the only method for removal of pathogens from prepacked frozen product.

Single treatment of gamma radiation can make spices free of insect infestation and microbial contamination without losing flavour components. The treatment can also be used for prepared ground spices and curry powders.

(Pashudhan 3(5), 1988, 2)

82 Microwaves and health

If you want to try some chemistry in a kitchen microwave oven, be warned: microwaves are dangerous and must not be allowed to escape the metal-lined cavity of the oven. You should use a microwave detector, which costs only a few pounds, to check that the microwaves do not leak through an ill-fitting door. In the laboratory, it is especially important to check for leakage if you make any modifications to the oven. Avoid heating volatile substances that could produce flammable mixtures inside the oven. Remember; micro wave ovens have burst into flames even during cooking such innocent delights as mince pies.

Microwaves cannot penetrate metal but they can still induce electric currents and sparking if you put wire, or even gold-rimmed crockery, into an oven. Because conventional thermometers and thermistors rely on metal to work, you cannot use them inside a microwave oven. Instead, for temperatures up to 400°C, you must use an optical-fibre sensor. For temperatures higher than this, you need an infrared sensor.

If you are thinking of using microwaves to heat an organic solvent in the laboratory, there are a few guidelines for safety: use sealed Teflon containers with a pressure release valve (Teflon is transparent to microwaves and can withstand a pressure of seven atmospheres); keep the volume of solvent inside the container at no more than 15 per cent of total capacity; and never expose a reaction to microwaves for more than five minutes.

For many years, people were worried that microwaves could be dangerous to living things, apart from any heating they induce. In 1984, there was a report that DNA absorbs microwaves, which might lead to genetic damage. Last year, groups of scientists at Uppsala University in Sweden and King's College in London showed that this was not the case. They independently checked plasmid DNA over the microwave range of 1000 to 10,000 megahertz and found no evidence of absorption. Other claims that microwaves affect hearing, heartbeat and the brain have also been discounted.

A certain amount of microwave folklore has, nevertheless, grown up. Researchers have reported that avacado stones produce weird plants when exposed to microwaves. Ants apparently survive inside microwave ovens, presumably because they are far shorter than the wavelength of the microwave radiation (12 centimetres).
(*New Scientist No. 1638, 1988, 59*)

Chloroxyn liquid for waste water pollution control

Extremely powerful multi-functional CHLOROXYN liquid is available for the effective treatment of the waste water, required as per the Pollution Control Act.

Addition of only about 50 to 100 ppm CHLOROXYN into the waste water: keeps the filter media clean; removes iron and managenese; destroy hydrogen sulfide; remove colour; prevent fermentation; prevent algae, fungus and slimy growth; enhance coagulation of suspended fine particles; destroy foul odour, and ensure sterilization from the water borne diseases.

For further information contact: Surfochem Industries, 3, Nilkanth Sadan, Peru bagh, Aarey Road, Bombay - 400 063.

Decaffeinate coffee by SFC

The world's second and USA's first plant to decaffeinate coffee by Supercritical Fluid Extraction (SFC) has been started up in Houston by General Food Corp's Maxwell House Coffee Co. (White Plains, N.Y.).

The unit's capacity is reported to be about 50 million lbs/ year, and that the route differs from the one at its HAGGF AG subsidiary in Bremen, West Germany, the only other decaffeination facility in the world to use SFE.

Decaffeination is generally done using such solvents as water/methylene chloride, water/CO_2 and ethyl acetate. In the GF plant, supercritical CO_2 is used to remove caffein from the beans prior to roasting. Extraction is reportedly done at 90-100°C, under a pressure of about 3,000-4,000 psi. The caffein laden solvent is then depressurized by passing it through a valve into another vessel.

The caffein precipitates as a result of the pressure drop and is separated from the gas. About 97% of the caffein is removed, which is similar to the efficiency of other processes. The main reason for adopting the route is a very pronounced improvement in quality and flavour of coffee over any other process.
(*Chemical Weekly* 34(14), 1988, 81)

85 US food cos to stop use of palm oil, coconut oil

Major American food companies have decided to stop using coconut oil and palm oil in their products because of health concerns, a published report said.

These oils are high in cholesterol and are said to cause heart attacks, reports PTI.

The Philippines, produces 39.8 per cent of coconut oil in the world and Malaysia produces 56.6 per cent of palm oil. They are major exporters of these oils to the US. The two countries are fighting a losing battle to convince the food companies that the consumers are wrong and that longevity does not depend on the kind of oil one consumes.
(*The Economic Times* 7 February 1989, 3)

86 Vanaspati units plea to relax BIS specification

The Indian Vanaspati Association has urged the Bureau of Indian Standards (BIS) to relax the specification in regard to coating on tin on 15 kg containers used to pack vanaspati.

The specification stipulates that the tin coating on the containers should be 11.2 gm on 15 kg tin. The reason for higher tin coating appears to be at the insistence of defence authorities for whom vanaspati is packed in larger packs to withstand their transportation and storing conditions which are rigid.

The only three manufacturers of tin plates in India are not able to meet the demand of the vanaspati industry. The total tonnage of tin required which is fully imported is about 5000 and foreign exchange outgo is about Rs. 150 crores. If the thickness of the coating could be halved to 5.6 gm, foreign exchange valued at about Rs. 80 crores could be saved. It is also necessary to examine whether thinner sheets could be used to manufacture the container.
(Financial Express 21 January 1989, 4)

87 Ban on use of colours in food items likely

Use of colours in food items is to be banned.

There was a consensus in this regard in the Lok Sabha on Wednesday.

The Health Minister, Mr. Motilal Vora, accepted the Speaker, Mr. Balram Jakhar's suggestion to bring forward a Bill banning use of colours in food articles.

The issue figured during Question hour when several members expressed grave concern at the widespread use of banned colours in food items, which, they said, has become a major health hazard.
(Financial Express 1 December 1988, 4)

TRANSFER OF TECHNOLOGY AND NEW INDUSTRIES

88 Public sector food processing unit in Tamil Nadu

The Union Government is planning to set up a Rs. 5 crore food processing unit in Yeracaud in Tamil Nadu in collaboration with Swiss firm. The unit will have cold storage facilities for mango, pineapple and apple pulp besides potato chips, chicken and eggs.
(*Chemical Products Finder* 7(7), 1988, 148)

89 Foray into food processing

Britannia Industries Ltd (BIL) has cooked up plans to enter the rapidly expanding food processing business. Its menu: snack foods and texturised vegetable protein products. In snack foods the company is to initially make only nuts, cheese balls and cheese curls. "Texturised vegetable protein products", says Sunil K Alagh, BIL executive vice-president. (operations),"will be easy to cook and will be available at affordable prices".
(*Business World* 15-28 February 1989, 39)

90 Double cola to enter food processing

Double Cola Manufacturing Co (DCMC), the soft drink manufacturers promoted by a group of non-resident Indians, has entered into a technical arrangement with Alfa-Laval of Sweden for the supply of machinery needed for its fruit and vegetable processing plants. While Alfa-Laval will provide the homogenisers and pasteurising equipment, Italian and Japanese technology will be used for processing.

The company will initially introduce fruit juices, pulps and ready-to-drink beverage. The food processing activities will be an extension of its soft drink manufacture and will be set up at the company's soft drink plants where additional capacity is available.
(*Chemical Products Finder* 7(8), 1989, 100)

91 Liquipaks' venture

Liquipaks India Ltd has signed a memorandum of understanding with Duke & Sons to manufacture and market a new range of fruit juice products in tetrabrik containers. The company is poised to launch in Bombay and Pune initially. It is making special efforts to reach about 40,000 outlets in Bombay.
(Industrial Products Finder 17(2), 1988, 81)

92 Pineapple juice unit coming up in Assam

Modern Food Industries (India) Ltd is setting up a pineapple juice concentrate plant in Silchar, Assam. This is scheduled to be completed by 1989-90. The company is planning additional bread line and the facility in the Delhi bakery unit was commissioned in November 1988. The expansion of the fruit juice bottling plant in Delhi was also completed and the expanded capacity was inaugurated in 1988. The company achieved a gross turnover of Rs. 46.39 crore during 1987-88 against Rs. 42.24 crore in 1986-87.
(Chemical Products Finder 7(9), 1989, 149)

93 100 per cent instant coffee export unit set up

Asian Coffee Ltd, Secunderabad, is the first-ever 100 per cent instant coffee project, set up at Brahmanpalli village in Medak district of Andhra Pradesh. The Rs. 11.45 crore project, set up in technical collaboration with Brazilian Food Project Ltd (BFP), will have a capacity to produce 1,500 tonnes per annum of pure soluble coffee. It also has financial participation from Brazil and the Commonwealth Development Corporation (CDC) of the UK.

The equipment for the project has been obtained from suppliers all over the world, including Niro Automizer of Denmark for the supply of spray dryer. The plant is equipped to use both Arabica and Robusta coffee beans. The finished products will be marketed both in the US and the UK through leading retailers.
(Industrial Products Finder 17(3), 1988, 101)

94 Instant tea from goodricke

Goodricke Group Ltd (GCL) has started implementing its instant tea project. A pilot plant has been established at one of the tea estates and trial production has started. Test marketing is expected to begin sometime next year. According to the Chairman, Mr. M W Butterwick, the product would be highly superior to any other instant tea. The company's exports for the year ended June 1988 stood slightly higher at Rs. 2.39 crore.
(*Chemical Products Finder* 7(9), 1989, 162)

95 Amrit protein to launch soya products

Amrit Protein and Foods, a company promoted by Amrit Banaspati, is setting up a Rs 14.5 crore project at Ghaziabad, U.P., for the manufacture of soyamilk and soyamilk-based products. The project will have an installed capacity of 23,500 kilolitres of soyamilk per annum. Trial production of this project, which will use Danish technology, will begin in January and commercial production in March. The company has developed the typical flavours and consistency to the palate of Indian consumers and has developed a device to remove the beany taste of soya disliked by Indians. The company will manufacture mainly soyamilk and soyamilk-based products like cheese and other items.
(*Chemical Products Finder* 7(6), 1988, 129)

96 Rice processing plant in Punjab

A Rs 62-crore rice processing plant, set up by the Oswal Agro Furane at Dhuri in Sangrur district of Punjab was recently inaugurated. The complex will be processing 5.76 lakh tonnes of paddy per annum. The company has signed an agreement with the Food Corporation of India for the supply of six lakh tonnes of paddy per annum for five years.
(*Chemical Products Finder* 7(8), 1989, 110)

97 Cadbury's into ice-cream

Hindustan Cocoa Products Ltd (HCPL), manufacturer of Cadbury's Chocolates and Food Drinks plans to enter the Ice-cream market in India. Test marketing of HCPL's "DOLLOPS" range of ice-cream will commence in January 1989 in Hyderabad. Some unique flavours and product innovations are planned as a part of the entry strategy.

Since ice-cream manufacturing in India is presently reserved for the small scale industry, and a large capacity lies unutilised all over the country. HCPL plans to get its Ice cream products manufactured by such small scale units and provide them technical assistance and guidance to attain high overall quality and hygiene standards.

Cadbury's entry into the Ice cream field is expected to accelerate the development of a "cold chain" of low temperature storage facilities throughout the country which is required for Ice cream and similar products.
(*Commerce* 157 (4045), 1988, 25)

PERSONALIA

98 New Director for Spices Board

Dr. C.K. George has assumed charge as Executive Director of the Spices Board.

He was holding the post of joint commissioner (horticulture) in the Union Ministry of Agriculture till now, says a Spices Board release.
(*The Economic Times* 18 December 1988, 1)

SPECIAL ARTICLE

COLOURS IN FOODS

Nature would not have been so beautiful if there were no varying shades of colours. Colour is a psycho-physical phenomenon which, apart from adding an aesthetic touch to life, forms one of the important criteria for quality judgement and acceptance, influenced by experience and association. Thus colour renders food appealing and appetizing. Apart from giving an attractive appearance and substantial visual appeal, food colours also help elicit cephalic phase of gastric secretion, thereby promoting digestion and absorption of nutrients from food. It is of paramount importance that the food which we consume every day should be devoid of any extraneous matter such as additives and pesticide residues. However, in modern times, with both the spouses going out for work, processed foods find their way into the household.

Processed foods

Processing of food, as is known, helps avoid wastage of seasonal surpluses of perishable products, ensures their uniform supply throughout the year and enables availability even in distant areas. Artificial colouring becomes a necessity in the modern technology of processed foods, especially in the case of canned and pulped fruits and vegetables which tend to lose their natural shade during processing or storage.

It is logical to think that natural colours should be used in colouring foods. This is because we do ingest these natural colours to a certain extent and hence they can be assumed as harmless. However, the difficulties in the use of natural colours are mainly as follows :

1) High cost of extraction and low yields
2) Colour instability with altered conditions of pH, light, heat and freezing
3) Low tintorial value

The intake of these natural colours will be higher when added to foods, since larger amounts have to be used to achieve a desired shade. Moreover, the added natural colour may react with the nutrients and can make them unavailable. According to the industry, natural food colours have not been commercially and economically produced in this country. Hence to meet the demands, we may have to depend on synthetic colours to be used in foods.

Synthetic colours

The chemical colouring substances which can be used in food industry are commonly known as 'Coaltar colours'. This is a misnomer and needs to be corrected as 'Synthetic colours'. The profile of global production of food colours is given in table-1. Based on the production/population ratio, the availability of food colour in India is computed at 0.6 mg/day/person. It may be interesting to note that this is 50 times less than the intake figure in USA and 30 times less compared to that in UK.

Table 1.

PROFILE OF FOOD COLOUR
PRODUCTION IN THE WORLD (1982)

	Tonnes
USA	2540
Western Europe	1160
Asia	1315
South America	870
Africa	625
U.K.	495
Australia	255
East Europe	240
India	135

Most of the synthetic colours have been extensively tested in conventional toxicity studies. Usually the toxic effects are observed at very high level of intake i.e., at 1-5% level in the diet. Such a level of intake is not practically seen in reality. The acute health hazards posed by these substances often appear small compared to those of other dietary constituents. However, most of these colouring substances are considered to be carcinogens. With due consideration to the toxicological data available, each country permits use of certain synthetic colours in foods.

The number of synthetic food colours permitted in Australia is 17 while USSR permits the least number viz.3 and Greece is the only country which does not permit use of any synthetic colour. The Government of India permits 10 colours. France, West Germany and UK use more number of colours than India. USA, Japan and Canada permit 7, 8 and 9 colours respectively.

The toxicological data collected from the literature on permitted food colours in India are summarized in table-2. Based on these data the WHO has allocated the Acceptable Daily Intake (ADI) for these colours. Synthetic food colours permitted in India and their ADI are given in table - 3.

Abuse of colouring substances

On a compilation and analysis of data over a 11 year period (1960-70) on 12,575 coloured food samples (milk products, non-milk products, pulses and miscellaneous items such as sugar products, soft drinks, alcoholic beverages, other beverages, tea, some spices and condiments), S.K. Khanna et al., from U.P. found use of non-permitted colours in 70% of samples. Frequency of use of non-permitted colours are metanil yellow (29%) rhodamin (8%), melachite green (4%). According to their latest study (1985) as compared to city markets, rural population was experiencing a greater degree of threat from the use of non-permitted synthetic colours.

A limited survey conducted by us recently in Hyderabad showed a similar trend between urban and rural areas in the usage of non-permitted colours in foods. However, surprisingly, the magnitude of usage of textile colours in foods has reduced considerably. Perhaps this could be due to the awareness of the toxic effects of non-permitted colours both among the manufacturers and consumers. Availability of permitted colours in smaller packets under ISI Certification could be another reason.

Table-2

DATA ON SAFETY EVALUATION OF FOOD COLOURS

Colour	Metabolic studies	Short/Long term studies	Teratogenic, Mutagenic Carcinogenic studies
1. Amaranth	Reduction seen at Azo linkage	No evidence of toxicity British study shows difference	Nonteratogenic, Non mutagenic Carcinogenicity controversy
2. Brilliant blue	Poor absorption	No adverse effects	No toxic effects
3. Fast green	Poor absorption	No mortality, No toxicity	No carcinogenicity
4. Green S.	Poor absorption	No ill effects	
5. Indigo carmine	Mostly excreted Poor absorption	No toxic effects	No alarming signs of toxicity
6. Ponceau 4R	Bile plays an important role. All eliminated	No deviation seen	No toxic effects
7. Sunset Yellow	Gut flora plays important role Reduced, metabolites are excreted	No effects on growth rate, organ weights	No tumorogenicity/ Carcinogenicity
8. Tartrazine	Major portion is excreted as metabolites	No adverse effects	No evidence of tumor formation. Allergic reaction implicated in certain cases.
9. Erythocine	Poor absorption	No adverse effects	No cytogenic effects & Carcinogenici
10. Carmoisine	No absorption	No toxicity	No harmful effects

PFA Regulations

Under the Prevention of Food Adulteration Act (PFA) Rules, the Government of India has stipulated (in Rules 30, 32 and 33) that the maximum amount of colour permitted in food is 0.2 g/kg i.e., 200 ppm; synthetic colour used should be pure and free from harmful impurities; and every label on the food which is permitted to contain a colour shall carry the statement 'contains permitted colouring agent'.

Table - 3

ADI OF PERMITTED SYNTHETIC COLOURS IN INDIA

Colour		Name	Accepted daily intake (ADI) (mg/kg. body weight)
A	Red	1. Amaranth	0.75
		2. Carmoisine	1.25
		3. Erythrosine	1.25
		4. Ponceau 4R	0.125
B	Yellow	5. Sunset Yellow	2.5
		6. Tartrazine	7.5
C	Green	7. Green S.	5.0
		8. Fast green	12.5
D	Blue	9. Brilliant blue	2.5
		10. Indigo Carmine	5.0

All the 'natural' or synthetic food colours should be sold only under ISI Ceritfication mark. The 10 permitted synthetic colours can be added only in certain foods specified in Rule 29 of PFA Act.

Implementation of food laws

To implement these food laws, Government Analysts need simple and quick methods to identify adulteration. Recently we have developed a simple and rapid method for differentiating permitted colours from textile colours. This method can be carried out in the field by Health Inspectors and also at the household level. The most salient feature of this method is that it does not require use of any standard colour or special solvents or equipment.

Now the question arises as to whether we should straightaway accept what WHO has recommended and permit use of these colours and compute ADI on that basis in our country. One should give some thought as to why certain other countries do not permit some of these food colours.

Dietary habits and toxicity

Dietary habits influence the toxicity of a substance. Since the safe limits of pesticide residues in cereals as allocated by WHO do not hold good in our country, we have to redefine our own safety limits and ADI. This calls for further toxicological evaluation of both synthetic and natural colouring material.

The following precautions become mandatory while using synthetic colours in foods.

(a) Stop the use of those synthetic colours which fall under any shadow of doubt (b) Replace synthetic colours by natural colours in a phased manner after safety evaluation. (c) Allocate safe limits and ADI after toxicological evaluation of synthetic colours carried out under Indian conditions such as undernutrition and prevalent food habits (d) Introduce a constant monitoring mechanism to ascertain possible ill effects of food colours, and (e) Educate small scale manufacturers and consumers about the harmful effects of non-permitted colours.

The government is pressurised periodically to place total ban on food colouring in order to check adulteration. It should be realised that surveillance and not mere legal action is the panacea.

If a total ban on food colours is considered essential to protect interests of public health, it is imperative on the part of the government to ban other food additives and also use of other natural products like supari (betel nut), tobacco etc., which are well established carcinogens in animal systems as well as in humans. However, if after careful scientific evaluation, acceptable intakes are determined, it should be possible to permit both natural and synthetic colours.

Dr.Babu, S and
Dr. Shenolikar, I.S.

(Reprinted from Nutrition News 9(6), 1988)

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RAW MATERIALS

99 New varieties of oilseeds evolved

Biotechnologists of the Indian Agricultural Research Institute (IARI) have virtually worked wonders with the oilseed plants (Brassica species), treating the much-needed opportunities for evolving new varieties capable of making the country self-sufficient in cooking oils.

Some of the plants, regenerated in test-tubes from tissues are deemed precious because of their rare genetic characteristics which can be gainfully exploited.

Among the genetically manipulated material having commercial potential, is the new source for resistance to shattering in rapeseed (Brassica napus). One of the formidable handicaps the cultivation of rapeseed throughout the world is the absence of resistance to shattering in the available germplasm. The gene carrying this character is therefore, expected to carry good intenational price.

This gene has been successfully introduced into the plant through a complex technique of wild hybridisation between speci which are generally difficult to breed. The "reconstituted plant" has shown normal flowering.

According to the head of the biotechnology centre, Prof. V.L. Chopra, this character can now be transferred to the species (Brassica Juncea) predominently grown in India.

An achievement of the biotechnology centre, which can be o significant immediate importance is the evolution of over a hundred genetically superior lines (scientifically called somaclones) of the popular variety, Varuna. These lines have already gone through one year of experimental testing and have shown a remarkable improvement in some of the agronomic traits, especially early crop maturity. This helps the plants to escape moisture stress besides diseases and pests, including the dreaded aphid.

(The Times of India 9 March 1989, 8)

100 Soyabean for more milk

Roasted soyabeans fed to cows as feed supplement increases milk yield substantially according to a study conducted at the University of Nebraska, U.S.

Experimenting with lactating cows, researchers noted that roasted soyabeans fed to the animals either whole, ground or pelleted along with hay, silage and corn brought about an increase in the level of milk yield compared with raw soyabeans. It was also found out that roasted soyabeans gave better results than soyabean meal. Feeding them as such also helped in prevention of rancidity problems in cows.

(*The Hindu* 19 April 1989, 24)

STORAGE AND INFESTATION CONTROL

101 Honey can substitute for sulfite preservatives in wine/fruit juices to prevent browning

Honey has proved a good possible substitute for sulfite preservatives in wine and fruit juices and if it is used early enough in production, should not affect the sweetness of the beverages. Sulfites are used to prevent unwanted fermentation and oxidation, but a small number of people are allergic to them.

Scientists at Cornell University's Agricultural Experiment Station in Geneva, N.Y. explain that 1-10% by weight of honey can be added to fruit juices, which are then agitated and allowed to settle at room temperature for several hours. A brown sludge of macromolecules sinks to the bottom of the juice and is filtered out and the juice stays clear indefinitely. The researchers are not quite sure what component of the honey is the important one, but they believe a protein originating with bees (rather than flowers) is responsible for inhibiting browning.

(*Chemical Weekly* 34(27), 1989, 82)

102 Preserving foods with natural additives

In modern food technology not all preservation methods involve mechanical treatment. Another process preferred to add shelf-life is to inhibit rancidity by using natural preservatives.

Synthetic antioxidants have been used for some time and with the blessing of most countries around the world. BHA and BHT and TBB are permitted in USA and most European countries but rancidity remains a problem. What's more, consumers are keenly aware of the presence of these additives on a label.

Rosemary and Sage have been used as antioxidants in meats. Rosemary extracts have also been used in bland foods, such as instant potato products. Unfortunately increased use has been limited by high flavour levels, prior solubility and other processing difficulties.

As a result of a recent new extraction procedure developed at Rutgers University by Dr. Stephen Chang, the use of natural antioxidants has become more practical.

The procedure has been licensed and commercialised by Kalsec Inc. (Kalamazoo, Mich). The antioxidant fraction in Rosemary has been effectively extracted and standardised in an oleoresin readily soluble in oil. It is also offered in water dispersible and speciality formulations. The product is called 'Herbalox seasonings'.

Recent tests at Michigan State University indicate 'Herbalox' helps to stabilize fats and essential oils against rancidity. It retards fading of carotenosal pigments, enhances the flavour of low pH dressings and sauces, and effectively guards against unwanted 'warmed over' flavours in food products. These occur when entries are relicated, introducing off flavour tests and aromas. Herbalox can inhibit the formation of these flavours even at levels of 0.05% based on fat content.

With the standardization of potency provided by Herbalox, food manufacturers can inhibit rancidity with an extract labelled 'Natural'. Applications include baked goods, breadings, cereals, confections, fat and oils, sausages, noodles, and processed poultry and meat snack foods, soup and bases and more.

Other advantages derived from using Herbalox include:

.. Simplified labelling. Natural flavour added is sufficient.
.. Protection provided is comparable to synthetic antioxidants.
.. Heat stability provides food carrying through for extended shelf-life products.
.. Control of the flavour, aroma and antioxidant fractions of simplified use.
.. Available in both oil-soluble or water dispersible forms.
.. Compatible with other ingredients.
.. Resistance to steam stripping permits low usage levels.
.. Excellent cost/benefit ratio.

Herbalox works by neutralising troublesome free radicals during oxidation. Rancidity results when oxygen reacts with fats. The chain reaction is propagated by highly reactive free radicals. A number of compounds in Herbalox are phenolic molecules capable of donating a hydrogen which stabilizes the radicals.

(*Chemical Weekly* 34(27), 1989, 81)

103 Hollow bamboo bin

The Indian Grain Storage Institute at Jorhat, Assam, has developed a new design of "Hollow bamboo structure" for storage of high moisture paddy seed. The structure is made out of locally available bamboo strips with adequate facility of aeration and drying as and when required. A lid has also been provided which can make the structure airtight as and when needed. Its capacity may range between 30 and 100 kg (paddy seed).

The structure was put under test with high moisture paddy content (20.2 per cent) for 12 months and after a 10 month storage period the moisture content was gradually lowered to 15 per cent. The seed germination was observed 76 per cent at 20°C and 78 per cent R.H. (relative humidity). (*The Hindu 19 April 1989, 24*)

104 Refrigeration expertise applied to cereals storage

Significant savings in drying costs for cereals stored in silos are possible using the Frig-0-Dry system now being introduced to Britain by Aiax (UK) Limited, the international manufacturer of refrigeration and air conditioning equipment for industrial and commercial purposes. These mobile Frig-0-Dry units are connected by flexible ducting to the base of the silos, as and when required, and are used to blow chilled and dehumidified air upwards through the cereals. The stored product is simultaneously cooled and dried by the air until its temperature and relative humidity are at the equilibrium conditions recommended for preservation.

This ability of the Frig-0-Dry to dry the grain while cooling it is a major advantage, because the operation can be discontinued a few points above the humidity that would normally be acceptable for storing grain having a higher moisture content, thus facilitating the cost-saving. The drier the product, the higher can be its storage temperature.

Mounted on a rubber-tyred, wheeled chassis equipped with towing bar, and operating from a 415 V three-phase 50 Hz power supply, the Frig-0-Dry system essentially comprises a packaged refrigeration unit and a centrifugal fan housed in a heavy galvanized and painted steel enclosure. The fan draws external air in through a filter, across the refrigeration evaporator and through a reheat coil to control the humidity before discharging it into the silo. The required temperature and humidity conditions of the cereals are set by positioning the variable controls on the built-in-Frig-0-Dry monitor, which is connected to a cable temperature probe extending the full depth of the silo. The unit is very easy to operate.

Four models are available operating on R22 refrigerant and providing refrigerating capacities of 15, 30, 60 and 120 kWh^{-1} (4.25, 8.5, 17 and 34 TR), respectively. In equivalent weight of cereals, these models will treat 30-45, 60-90, 120-180. and 240-360 tonnes weight during a 24 h period.

Refrigeration treatment preserves the cereals for long periods, without loss of quality, so that the product is always at optimum marketable condition. Losses caused by cereals 'breathing' are avoided. The development of insects, parasites and moulds is prevented, thus eliminating the need for chemical disinfestation.

For further information contact: Aiax (UK) Limited, Veneto House, Park Drive, Rayners Lane, North Harrow, Middlesex HA27LT, UK.

(Int. J. Refrig 12(1), 1989, 51-52)

105 Passive evaporative cold storage for potatoes

A team of researchers at the Central Potato Research Station, Jalandhar, Punjab, have developed a unit for passive evaporative cold storage of potato, to minimise losses during storage.

The unit works on the principle of passive evaporative cooling. Its outer walls are made of bricks or stones. A small cavity left in between these walls is filled with rice husk. On one of its wall are ventilators packed with wood-wool. The wood-wool is continuously moistened with dripping water. Its floor has a wooden platform for putting potato bags.

On the top is a wind shield which acts as an exhaust. At this shield is removed, air comes out through a hole. Under the shield are two wire-mesh screens through which cold moist air comes in. Wood-wool is packed in between these screens.

As the shield is removed, humidified, cool air enters the stores through the ventilators and hot air rises above the ceiling and escapes through the exit. As the air comes in, it evaporates and produces a cooling effect. The lower temperature and considerable higher relative humidity help to store potatoes better.

The temperature inside the storage-unit varies from 6-13 degrees Celsius, which is lower than the ambient temperature during March to June. With the decrease in temperature, the relative humidity increases upto 76.5-94.0 per cent. The stored potatoes give 100 per cent sprouting while seeding, and the total loss in weight is comparable to that of potatoes stored in conventional stores.

The unit has been found to be well-suited for storing potatoes upto the beginning of June even in the Western Indo-Gangetic plain, especially in regions where cold-storage facilities are inadequate and potatoes are stored in ordinary stores during the hot summer months (SD).

(*P.T.I. Science Service* 8(4), 1989, 5)

106 New food preserving process

An Australian Company, Garwood Limited, Melbourne, has invented a food packaging system which enables perishable food to remain rich and fresh weeks after chiller storage. Called Flavaloc, the new pack has a polymer membrane pillow which serves as a reservoir for a gas mixture. The gas mixture diffuses at a controlled rate into a chamber containing the pershable food, preserving its freshness and appearance while suppressing bacterial and fungal growth.

(*Invention Intelligence* 24(2), 1989, 63)

107 Scaring away the rodents

A scientist at the Jawaharlal Nehru University has developed a simple and inexpensive electronic device to scare away rodents instead of instantaneously killing them. According to Dr.J.Behari, Associate Professor at the School of Environmental Sciences at JNU, the new device offers greater promise in food grain godowns where foodgrain worth millions of rupees is destroyed or devoured by rodents every year.

This instrument emits frequency waves in air in all directions bringing about panic and stress conditions upon the rats acoustic nerves and cerebrum which in turn causes disorientation and confusion. The result is that rodents try to get away from the godown as early as possible. The effect of the ultra-sound is that they eat less, reproduce less, develop low-body-resistance and become inactive.
(*University News* 27(10), 1989, 17)

108 Weather proof bait stations for rodent control

To combat the widespread menace of rodents in the country, Indian scientists have developed new weather-proof rodent "bait station" which, they say, may offer the best method as yet of rodent control.

India is estimated to have over five thousand million rodents, of 52 diverse varieties, that cause extensive damage to the crops. Controlling these animals during rainy season poses a special problem, as most of the baits put inside the traps deteriorate very fast in the rains. Scientists at the Garhwal University, Uttar Pradesh, have attempted to find an answer to this problem with the development of new weather-proof traps that do not get affected by the rains.

The "bait stations" are of two types: the first type consists of a polyethylene-clad hut like structure. It is 25 cm long, 15 cm wide at the base, has a slant height of 15 cm and can be opened from both sides. It costs only 40 paise. The second type is a cylindrical metallic container with a radius o 5.5 cm and length of 25 cm. It can be opened from one side only. It is provided with a hood projected 6 cm over its mouth to guard the bait against the showers. It costs Rs. 1.20 only.

For the bait, 0.005 per cent bromadiolone or small tablets containing four grams of zinc phosphide, 96 grams of grain or flour, half-spoonful of mustard oil and water are used. The traps are placed at the mouth of burrows of rodents.

These bait stations have been used to control four dangerous rodent species affecting the finger millet or 'ragi' fields in the country during rainy season. Both types of bait stations, paper polythene hut and metallic tin, proved to be very effective, causing about 87.5 and 92.5 per cent rodent mortality respectively, according to a report in the 'Indian Journal of Agricultural Sciences'.

(P.T.I. Science Service 8(5), 1989, 3)

FOOD ADDITIVES

109 Improving qualities of dairy products via biotechnology

Enhancing the flavour and textures of fermented dairy products by genetic engineering will be possible in future. Through genetic engineering, it will be possible to construct starter cultures than confer unique qualities to fermented products. For example, it may be possible to develop cultures capable of producing natural flavour compounds (peach, banana, berry, citrus) or protein with intrinsic non-caloric sweetness properties (aspartame, therimatin, stevioside) to enhance the flavour and eliminate the need to add sucrose during the manufacture of yoghurt or flavoured cheese spreads. Construction of strains capable of producing extracellular polysaccharides would eliminate the need for the addition of stabilizing or thickening agents in yoghurt.

Dairy products serve as a primary source of calcium in the human diet. In addition they are an excellent source of protein and fat-soluble vitamins. However, most dairy products, with the exception of yoghurt and cottage cheese are often high in saturated fats and cholesterol. In the future, it may be possible to engineer starter cultures with the capability of enzymatically modifying cholesterol to nonatherogenic steroid derivatives. Similarly, it may be possible to enzymatically modify the saturation level of fat or to alter the absorbability of saturated fats fraction.
(Chemical Weekly 34(35), 1989, 81)

PROCESSES

110 Amino acid from sugar fermentation

A University of Melbourne research team, has developed a process for low-cost production of the amino acid tryptophan, from bacteria. Tryptophan is one of the 'essential' amino acids, used in pharmaceuticals and health foods. Tryptophan has proved difficult to produce cheaply, so its use is more restricted than that of the other amino acid food additives.

Although animals are generally not able to manufacture this amino acid, bacteria can synthesis it via fermentation from sugar. But bacteria produce only enough tryptophan for their own needs - they have developed a number of control mechanisms that regulate production of the substance.

What the team did was to identify these control mechanisms and 'switch' them off. To further increase the production of tryptophan. The researchers added copies of certain genes to the bacteria's DNA to enable the organisms to make 100 times more tryptophan than usual.
(Asia-Pacific Tech Monitor November-December 1988, 21)

111 Coconut oil extraction process

National Institute of Science and Technology, Philippines has developed a simplified and cheaper process of extracting edible oil from coconut without the use of sophisticated equipment. The end product extracted it is reported can be stored for 3 to 6 months without change in colour, flavour and odour. The milk is extracted from the coconut by hand pressing. The extracted milk is then allowed to stand for one hour to separate the cream from the skim milk. Cream is filtered and washed with salt solution, finally with tap water several times to remove other elements present other than oil. The washed cream is then boiled to remove excess water and to allow the fine solid cream to subside. The remaining cream is filtered before storing in closed bottles.

For details contact: National Institute of Science and Technology, P.O. Box 774, Metro Manila, Philippines.
(*Asia-Pacific Tech Monitor*, November-December 1988, 21)

112 A new protein-rich corn oil developed

Corn kernels contain less than 10% protein. This low protein content does not match up too well against something like soybeans, which contain 38% protein. In addition, the corn protein is low in two 'nutritionally vital' amino acids lysine and tryptophan. Research work which began in USA in the 1970s to increase corn's lysine content has now come to fruition, and the researchers are seeking a patent on the technology. Cytogeneticist Ron Philips and his research group at the University of Minnesota have found a gene that effects lysine production sometimes increasing it as much as 20%.

The University of Minnesota researchers note that an improved corn twice as nutritious as the ordinary variety was recently introduced in Mexico. But that corn gave 'floty, soft kernels that do not store well' and the improvements depend on 'a complex genetic system, rather than one gene that gives high lysine' Phillips reports. The new corn variety developed by the Phillip group brings no undesirable effects, and the fertility and quality of the corn is completely normal.
(Chemical Weekly 34(35), 1989, 83)

113 Coconut oil derived surfactant

In India, coconut oil finds use in foods and edible products. However worldwide, use of coconut oil in edible products is declining, while its use in industrial and soap products is progressing. Market for coconut oil fatty acid is also growing slowly in USA. There is a long term trend towards increased use of coconut and palm kernel oils in fatty alcohols. Two new UD alcohol plants have been announced.

Recently, Stepan Company has unveiled Alpha Step ML-40, a new safe biodegradable anionic surfactant. The alpha sulfomethyl ester product is derived from a natural renewable resources- coconut oil - and is completely independent of ethylene based raw materials.

Alpha-Step ML-40, an aqueous solution of sodium alpha sulfo-methyl ethyl laurate, exhibits food detergent and foam properties, in addition to being an excellent solubilizing agent - for high active systems and readily soluble in water. Dry skin irritation studies show the new surfactant is milder than conventional lauryl ether sulfate.

It is recommended for use in heavy duty laundry detergents, manual liquid dishwash, fine fabric wash, hard surface cleaner, shampoos, liquid hand soap and bubble baths.
(Chemical Weekly 34(35), 1989, 82-83)

114 Bread without wheat!

A new, simple and inexpensive technology has been developed for making bread without wheat, using tropical roots, tubers and coarse grains.

The process carries the potential for reducing Third World dependence on imported wheat. Food and Agriculture Organisation (FAO) specialists say the use of traditional crops in bread production could have profound implications for developing countries.

Although roots and tubers nourish over 1,000 million people in Africa, Asia and Latin America, they have received little official recognition because they are not within the experience of many international experts.

It is estimated that each year about 550 million tonnes of staple roots and tubers are harvested worldwide. While potatoes constitute about half that harvest, and another 40 per cent comes from cassava, sweet potatoes, yams and taro.

Worldwide research for an alternative to wheat bread has been going on for 30 years. The main problem has been that non-wheat materials have no gluten-forming protein which, through kneading, gives bread its unique texture and flavour.

FAO has also successfully experimented with replacing gluten by Xanthan gum. The gum can be made by developing countries. but is expensive. The bread produced had a shelf-life of eight days, which is better than wheat bread.

Developed by FAO scientists, the new technology has overcome the gluten-problem. The process involves boiling part of the root or cereal crop flour until it forms a thick gel. cooling and adding the remaining flour, yeast, sugar and salt; mixing for five minutes and leaving the dough to rise to about double in size in a warm and humid place,

The technique is claimed to produce wheatless bread of excellent taste, texture and colour. The bread is also claimed to stay fresh longer than white bread. Its versatility allows combinations of flour from roots and grains to increase nutritional quality.

FAO has started discussions with developing countries such as Nigeria, Sudan and Cuba on the possibility of introducing the technology in order to make better use of local crops. Satin says a rural group in Kenya has successfully tried the technology.
(Deccan Herald 30 March 1989, IV)

115 Process to reduce cholesterol in milk

Scientists at Cornell University say they have developed a commercially feasible process to remove up to 90 per cent of the cholesterol and reduce the amount of saturated fats in milk, without significantly changing its taste.

The technique, similar to the process used to decaffeinate coffee, might also be used to produce a variety of other low-cholesterol dairy products like butter, cheese and ice cream, said Syed S.H. Rizvi, a professor of food engineering at Cornell's College of Agriculture and Life Sciences in Ithaca, N.Y.

Dr.Rizvi and his associates used a process in which carbon dioxide is injected into butter fat under high pressure, picking up cholesterol-laden fat. The butter fat, which gives milk its flavour, is manipulated to remove most of the cholesterol and then returned to the milk.

Dr.Rizvi said the resulting milk contains 2 per cent butter fat, of which less than 40 mg per gallon is cholesterol. Whole milk contains 3.3 per cent butter fat, of which about 532 mg per gallon is cholesterol.
(Deccan Herald 27 April 1989, I)

116 Food-grade protein from sunflowers

Scientists at the Highett, Vic., laboratory of Australia's CSIRO Division of Food Research have found a way to isolate sunflower protein free of colour. Their method extracts the protein in a continuous process, opening the way for commercial utilization. At the moment CSIRO is looking around for a company interested in developing the patented process to an industrial scale. The CSIRO team believes the cost of sunflower isolate would be comparable to that from soy, and probably less. The CSIRO process extracts about 40% of the protein from the meal. The residue remains a useful stock-feed.

For details, contact: Officer-in-charge, Dairy Research Laboratory, CSIRO Division of Food Research PO Box 20, Highett, Vic, 3190, Australia.

(*Asia-Pacific Tech-Monitor January-February 1989, 29*)

BY-PRODUCTS AND WASTE UTILIZATION

117 Shrimp processing waste utilization

A substance processed from the discarded shells of prawns, lobsters and other crustaceans is poised to become a wonder drug to arrest haemorrhage and speed up wound-healing.

The substance, "Chitosan", a derivative of the second most abundant natural polymer, chitin, has been cleared for use on humans by the Ethical Committee of the Trivandrum Medical College Hospital following "spectacular results" in a series of animal experiments conducted during the last three years.

The experiments, conducted by Dr.M.Sambasivan, Director and Professor of Neurosurgery in the medical college hospital, and Dr.Radhakrishnan, Pathologist in the Sree Chitra Tirunal Institute of Medical Sciences and Technology, have "conclusively proved" the haemostatic and wound-healing properties of Chitosan.

It was also established that Chitosan was bio-compatible and that there was no side-effect or reaction to this administration, Dr.Sambasivan said.

Excellent Results: Following the Ethical Committee's clearance, Chitosan powder was applied, "with excellent results" on two accident victims who had excessive haemorrhage. In both the cases, haemorrhage was arrested "speedily".

In another case, gauze impregnated with Chitosan was used as a dressing to cover ulcers which healed "very fast".

Both the Chitosan powder and the Chitosan-impregnated gauze were developed and made available to the hospital by the Central Institute of Fisheries Technology (CIFT), Cochin.

Dr.Sambasivan said while the haemostatic and wound-healing properties of Chitosan were known for long, how it acted to stop bleeding or speed up healing was not understood. The Trivandrum experiments could establish the mode of operation of the polymer derivative.

In keeping with the worldwide interest in the potentialities of chitin and Chitosan, the MATSYAFED (Kerala State Fishermen's Co-operative Federation) has set up a pilot plant for their manufacture at Neendakara, Quilon district, one of the major shrimp fishing and processing centres in Kerala. It has an assured supply of the raw material - the skeletal material of shrimps discarded by the fish processing units.

(Deccan Herald 30 April 1989, 7)

118 New source of amino acids

A Rs.123 million 100 per cent export-oriented project to produce amino acids from human hair is all set to go commercial, at Abishekapakkam village in the union territory of Pondicherry, with a Japanese concern supplying part of the finance and know-how, and giving an eight-year buy-back guarantee.

The Protchem Industries (India) Limited, a private concern which is entering the share market next month, has launched this ambitious scheme to make amino acids L-cystine and L-tyrosine, besides amino acid powder, used extensively abroad in the pharmaceutical, food processing and cosmetic industries.

Mr.T.K. Mohan and Mr.T.Manoharan, executives at the company, told PTI that while a private concern in Tirupati is currently making a small quantity of L-cystine from human hair, this is the first time that the technology to make L-tyrosine and amino acid powder is entering the country. It is proposed to manufacture 1,400 tonnes per annum (TPA) of amino acid powder, 84 T.P.A. of L-cystine and 24 T.P.A. of L-Tyrosine. The quantity of human hair required per year is expected to be 1200 tonnes.

Mr.Mohan and Mr.Manoharan say so far human hair is being exported from India to Japan, to make amino acids which have an expanding world market. Protchem's is Japanese collabortor, M/s Union Bros. Industries Inc., had set up three units in Japan and one in Taiwan for the purpose. Human hair has become an important raw material after the killing of whales, another source of animal protein, was banned. West Germany too has this technology.

Explaining the technical process, they said human hair procured from barber shops, is first hydrolysed with hydrochloric acid, then neutralised with chemicals like caustic soda and soda ash. After various pH adjustments, filteration and electrical drying, '100 per cent' pure L-cystine and L-tyrosine is obtained.

A unique feature of the technology is that the disposable effluent is not wasted, but treated to produce a powder containing as many as 19 amino acids. It is first treated in ion exchange towers for iron removal and then sent to an evaporator to turn it into a thick solution. The liquid is sterilised by steam in a sophisticated jacket vessel, and then spray dried, to produce the acid powder. Anti-air and anti-water pollution measures will be taken while disposing off the effluents.

They said the project cost of Rs.123 million would be met through equity capital, loans and shares. Selling at the rate of about Rs.300 per kg of L-cystine, Rs.200 per kg of L-tyrosine and Rs.30 per kg of amino acid powder, they expect a 25 per cent profitability at the present exchange rate for the Japanese Yen. Prices can be revised annually.

(P.T.I. *Science Service* 8(7), 1989, 1)

EQUIPMENT AND MACHINERY

119 Fuel-efficient grain dryer

Used in grain storage and processing, the Profit Master Grain Dryer is designed to yield high profits because it recycles all the cooling air and 48% of the plenum drying air. It has a grain exchanger to equalise the side to side moisture in the columns, so grain is handled gently and grain quality improved. Heat recycling at the grain exchanger, high efficiency profiled burner, the heat exchanger, and adjustable discharge are said to give this dryer high fuel efficiency and yield profits. It is available with capacities ranging from 14 to 56 T/hr.

For further information write to: QED Dryer Sales and Manufacturing, Inc..4993 27th Ave, Rockford, Illinois, 61109, U.S.A.

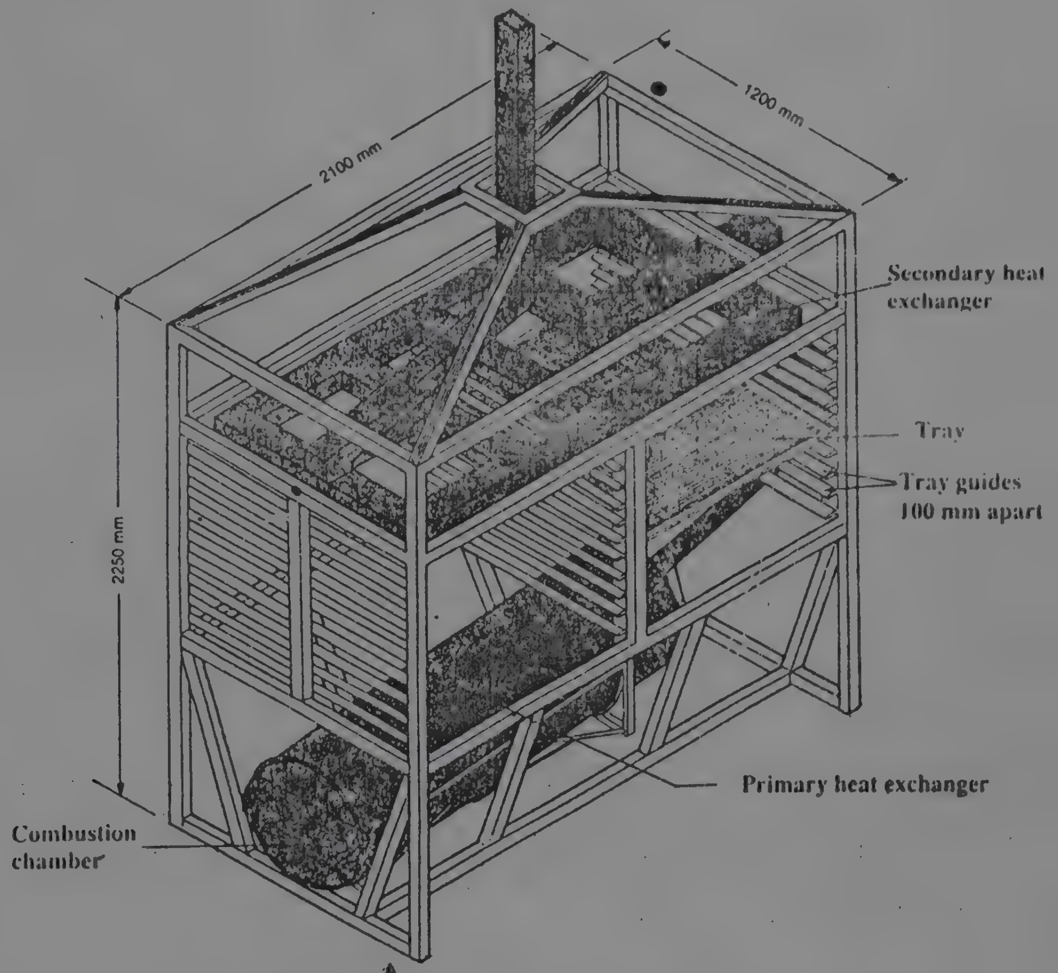
(Industrial Products Finder 17(6), 1989, 189)

120 Agro-waste fuelled root crop dryer

The Phillipine Root Crops Research and Training Centre of the Visayas State College of Agriculture in the Philippines developed a root crop dryer which utilizes agro-waste as fuel.

The dryer basically consists of the furnace chamber which also serves as the primary heat exchanger, the drying chamber and the secondary heat exchanger. The product being dried does not come in contact with the smoke or products of fuel combustion.

Heat needed for drying is supplied by the combustion of fuel in the burning chamber below the trays in the drying chamber. A clearance of 25 cm between the upper surface of the heat exchanger and the bottom trays is provided to avoid damage to the product being dried. During the drying process, ambient air is heated to an average temperature of 60°C on contact with the outer surface of the drum (primary heat exchanger) and moves up by natural convection. The secondary heat exchanger, consisting of rectangular ducts connected to the primary heat exchanger, is mounted above the drying chamber. It heats up the moisture-laden air from the drying chamber to prevent condensation and to facilitate its exit through the chimney.


2100 mm
1200 mm
2250 mm
Secondary heat exchanger
Tray
Tray guides 100 mm apart
Primary heat exchanger
Combustion chamber

Inside structure of the root crop dryer.

One batch of 100 kg fresh root crop chips can be dried on trays within 7-8 h requiring 50-60 kg of coconut husk for fuel. For uniform drying, the trays are alternatively rotated.

The dryer can be used for drying cassava and sweet potato chips as well as other agricultural and marine products with optimum drying results.

As of March 1988, eight prototype of the dryer were being used by root crop processors in the provinces of Samar and Leyte in the Philippines.

For details contact: Philippine Root Crops Research and Training Centre, Visayas State College of Agriculture, Baybay, Leyte, Philippines.

(Asia-Pacific Tech-Monitor January-February 1989, 29)

121 Spray drying plant

The SSP spray dryers are said to be relatively simple to operate. The slurry is atomised into the dryer chamber in the form of droplets. As these droplets come in contact with hot air, the water is evaporated and powder is formed. Atomisation is carried out either through high pressure nozzles or two-fluid nozzles. The selection of the atomising system is done based on the characteristics of the material to be dried. The dryer ensures flexibility in controlling the powder quality, and has provision for expansion of capacity up to 200%. The SSP spray dryers are used for milk, ice-cream mix, food flavourings detergents, enzymes, eggs, dyes, tea, coffee, boneglue, dextrose, etc.

For more details write to: Faridabad Stainless and Steel Products Co Pvt Ltd., 19 DLF Industrial Area-II, 13/4, Mathura Road, Faridabad, Haryana 121 003.

(Chemical Products Finder 7(11), 1989, 98)

122 Dehumidifiers/seed dryers

Bry-Air India Pvt. Ltd. offers the most simple and economical solution for seed drying/storage. The Bry-Air Dehumidifier/Seed dryer maintains perfect conditions for seed drying/storage. The seed dryer is based on the concept of physical adsorption which incorporates a chamber fitted with perforated trays for the seed to be placed and a dehumidifying dryer placed on top of the chamber. The seed dryers can handle

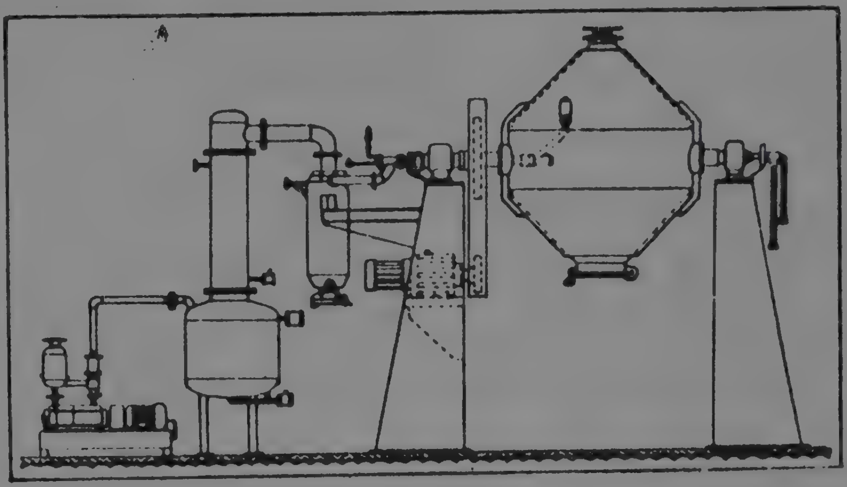
50 to 900 kg of seed per 8 hr. The Bry-Air dryer by maintaining the air at a lower moisture level increases the drying potential and the drying rate. The most advanced technology of desiccant dehumidification has been brought to India by Bry-Air India Pvt. Ltd., a joint venture with Bry-Air Inc., USA. Other products from Bry-Air include MVB dehumidifiers, Heat Recovery Systems, Plastic Dryers, Mold Dehumidification Systems, Material Conveying Systems, Wood Dryers, etc.

For further details contact: Arctic India Sales, 20, Rajpur Road, New Delhi 110 054.

(*Industrial Market Bulletin* 3(4), 1989, 12)

123 Rotary cone dryer

This is very useful for uniform and low temperature drying of heat sensitive chemicals and pharmaceuticals, fine chemicals It has a double conical vessel with rotating system and vacuum solvent recovery system. This equipment being rotating, there is no charring or retention of product. One can change the product at will. This equipment rotates at very low speed (5 to 15 RPM) resulting in less wear and tear, and requires very little maintenance. This can be used for crystalline products, granules in chemicals, pharmaceutical and food industries. The range is from 250 litres to 3,000 litres capacity. Pilot plant available for trial. Features include: totally sealed and protected from contamination; quick loading and unloading; fast drying, etc.



For more details write to: Bifriends Engineering Works, W-73 MIDC Phase II, Manpada Road, Dombivli (East) Dist Thane, Maharashtra 421 203.
(Chemical Products Finder 7(11), 1989, 98)

124 Food extrusion equipment

Age Technologies has developed a range of equipment for snack and pet food extrusion - to manufacture various shapes from a range of possible corn/rice/potato/soya based ingredients. The heart of the system is the extruder cooker which employs a unique dry extrusion process, creating heat through pressure and friction. Heat and pressure are used to cook and expand ingredients, gelatinise starch, destroy inhibitors where present, modify or sterilise by-products, and dehydrate moist waste materials. With this dry extrusion process, no additional heat source is required as it relates to the extruder function. Auxiliary equipment is also available from Age Technologies to clean and mix raw materials, cool extruded products, and apply flavour.

For more details write to: Age Technologies Private Limited, 712 GIDC, Makarpura, Vadodara, Gujarat 390 010.
(Chemical Products Finder 7(10), 1989, 61)

125 Multilayer co-extrusion plants

Multilayer plastic packaging is becoming popular for packing milk, edible oils, petroleum products, dairy products, vegetable oils, food products, tea, coffee, etc. The multilayer plastic film has many advantages over conventional packaging materials, viz, low price, good sealability, easy for printing, more shelf life, product visibility for consumer products, pilfer proof, ease of stacking and opening and required barrier properties to retain freshness and the aroma of the product. This has lead to the development of multilayer co-extrusion plants. Filmaster Inc, USA, manufactures such plants and has supplied 3 and 5 layer plants all over the world. Filmaster Inc specialises in manufacturing dies required for multilayer extrusion plants which are vital parts of the plant and its co-extrusion dies are US patented. Filmaster Inc offers multilayer plants in different film widths, suitable for various combinations of plastic raw materials and with semi automatic/automatic controls to cater to a wide range of applications. The film produced on Filmaster Inc plant is FDA approved for storing food stuff.

For further information write to: Square-T Consultant Pvt Ltd., 4/53 Vishnu Prasad, M.G. Road, Vile Parle (E), Bombay 400 057.

(*Industrial Products Finder* 17(5), 1989, 9)

Packaging machinery

Master manufactures a range of packaging machinery used in pharmaceutical, pesticides, food and chemical industries. The range includes high speed hydrojetting bottle washing machine, semi-automatic round can double seaming machine, stainless steel centrifugal pump, stainless steel gear pump. MLF-R1 fully automatic multi-heads rotary vacuumetric liquid filling machine, MRS-R4 fully automatic multiheads rotary RO/ROPP capping and sealing machine, MGL-1 fully automatic gumming and labelling machine, MGL-2 fully automatic volumetric liquid filling machine, MRS-3 fully automatic RO and ROPP capping and sealing. MGL-3A semi-automatic gumming and labelling machine, automatic bung pressing machine, semi-automatic round can double seaming machine, MLF-3 semi-automatic volumetric liquid filling machine, MVS-1 semi-automatic vial cap sealing machine, hand operated/semi-automatic batch printing machine semi automatic vacuumetric liquid filling machine, bottle brushing machine, semi-automatic bottle washing machine, MRW-1 rotary bottle washing machine, single head qutomatic crown corking machine, MRT-1 unscrambler, MRS-2 semi-automatic RO and ROPP can sealing machine, drying ovens, and SS horizontal filter press.

For more details write to: The Master Mechanical Works Pvt Ltd., Pushpanjali, S.V. Road, Santacruz (West), Bombay 400 054.

(Chemical Products Finder 7(10), 1989, 81)

127 Highly accurate liquid filling system

Accurate yet low-cost, the EF-100 Series Liquid Filler fills containers of all shapes and sizes. Its features include a programmable microprocessor control, compact design, and easy operation and cleaning. The instrument can fill any flowable liquid from millitres to gallons with an accuracy to ± 0.5% or better, the firm says. Various available options allow users in food, chemical, packaging, and cosmetic industries to customise the filler to specific requirements.

For further information write to: Adtech, Inc. P.O. Box 135, Rte 113 & Menseh Rd, Skippack, Pennsylvania 19474, U.S.A.

(Industrial Products Finder 17(7), 1989, 180

128 Powder filling machine

Eclat Auto Packs (Pvt) Ltd manufactures fully automatic machine to fill and seal hygienically products in powder form such as tea, coffee, detergents, spices, and pesticides.

For further information write to: Eclat Auto Pacts (Pvt) Ltd., 7-1-59 9 A 3, Daram Karan Road, Ameerpet, Hyderabad, Andhra Pradesh 500 016.

(Industrial Products Finder 17(5), 1989, 118)

129 · Tubular Hand maize sheller

Function:

Shelling of maize

Development at : Central Institute of Agricultural Engineering, Bhopal

Specifications

Type : Manual

Overall dimensions : 72 mm x 65 mm

Test Results

Suitability for crops : Maize

Capacity : 15-23 kg grain/h

Labour requirement : One

Economics

Cost of equipment : Rs. 10 (US $ 0.80)

Economic Parameter	Operational condition			
	100% custom hire	50% customs hire and 50% sale	100% sale	Self use
Working Capital Rs.	96	528	960	96
Cost of operation, Rs/q Maize (unshelled)	8.85	8.95	9.05	8.85
Break-even-point q/y	5.2	2	1.7	0.8
Annual net profits Rs.	67	370	672	n.a
Return on investment, %	172	219	226	n.a.
Employment generated, man days/y/ Rs.10,000 of capital investment	7732	1781	1007	n.a.

Salient Features:

Tubular maize sheller consists of MS tube and 4 Nos. of tapered fins rivetted inside so that inside portion can be used for small or big cob from either side. The maize cob is inserted from one end and rotated in the screwing manner. Remaining half of unshelled cob end is then inserted into the sheller for complete shelling.

Stage of Exploitation : Equipment under commercial production.

For further information contact: Central Institute of Agricultural Engineering, Nabi Bagh, Berasia Road, Bhopal 462018 (M.P.).

(Rural Technology Journal, December 1988, 25)

130 Improved oil expeller

A prototype of an improved oil expeller has been designed and developed at the Mechanical Engineering Research and Development Organisation (MERADO), of the Central Mechanical Engineering Research Institute, Ludhiana.

Most of the 36,000 odd oil expellers now in use in the country have frequent breakdowns and consume more power. The oil content of the cake produced in these expellers ranges from 8 to 12 per cent. The high content of residual oil is attributed to inefficient design, poor manufacturing technology and use of low-grade materials.

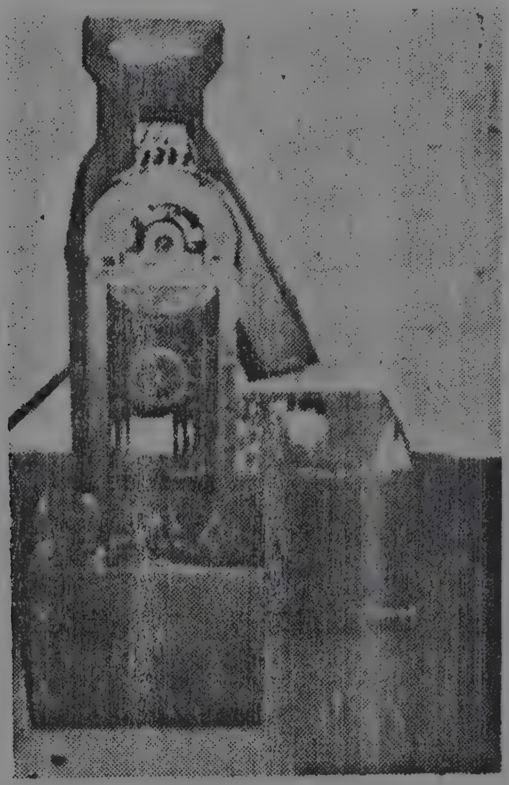
In order to increase the amount of oil expelled, a project, for development of a modern oil expeller with a crushing capacity of ten tonnes per day was undertaken at MERADO as part of the technology mission on oilseeds. The prototype developed at MERADO leaves a residual oil of 4 to 6 per cent in the cake and consumes less power than the expellers now in use.

The working life of the wearing components has been improved by choosing proper materials, ensuring proper metallurgical control and using hard face surface coatings. Similarly power transmission efficiency has been improved by redesigning the gear box and auto-lubrication of all friction surfaces.

(P.T.I. Science Service 8(5), 1989, 2-3)

131 Tapioca peeler

A machine for peeling the cork layer (skin) of the tapioca tubers has been developed in the Post Harvest Technology Scheme of the Department of Agricultural Processing, College of Agricultural Engineering. The machine consists of a rotor of diameter 25 cm and length 30 cm. The cutting blades have been mounted along the circumference of the rotor with a blade angle of 50'. The machine is powered by 1 HP electric motor. The capacity of the machine is 9 quintals of tubers per hour. The peeling efficiency and the percentage starch loss while peeling are 85 per cent and 4.5 per cent respectively. The cost of peeling with machine works out to Rs. 1.50 per quintal as against the cost of Rs. 12 per quintal in the conventional method of manual peeling. The saving in cost is found to be 87 per cent. The cost of unit with electric motor is Rs. 3500 each.

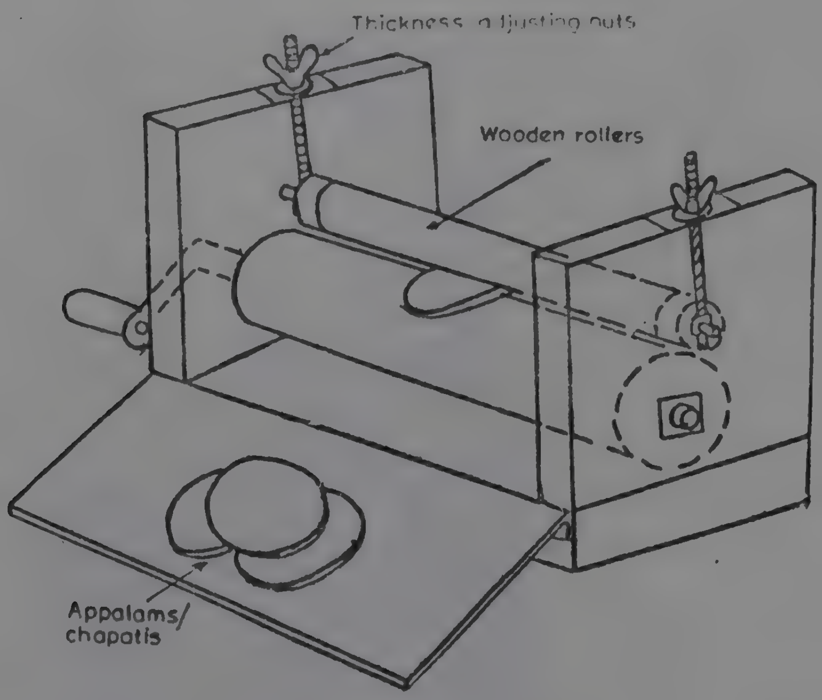


For further information contact: P.T.Palaniswamy, M. Balasubramanian, CT, Devadas and K.R.Swaminathan, College of Agri. Engineering, Coimbatore
(TNAU News 18(9), 1989, 2)

132 Chapati/papad making machine

Here is a simple machine (see sketch) that can be used for making Chapatis/Papad/Appalam speedily and easily.

From grams/wheat powder and water the required paste ball is made fed through the rollers. The small wooden roller at the top of the big roller (circumference of which is larger than the diameter of appalam) is adjusted by wing nuts to get the required thickness. After two or three feeds, by rotating a hand lever, the required thickness/size of chapati/papad is achieved and the papad is ready for drying and packing.



To avoid sticking of balls on rollers apply vegetable oil and/or dip the ball in wheat or rice flour.

For further information write to: S.Balasubramanian, Plot No.19, Extn. II, V.O.C. Nagar, Thuvagudi, Trichy 620022. *(Invention Intelligence 24(3), 1989, 103-4)*

133 Automated laboratory fermentor

Laboratory fermentors with modern electronic controls are essential in microbiological, biochemical and pharmaceutical research, especially for development and optimization of fermentation processes in the production of chemicals, antibiotics, enzymes and organic acids. The new modular bench laboratory fermentor is designed for cultivation of microorganisms in a batch culture to a fully instrumented continuous culture system. Equipped to minimize asceptic preparation and handling, its main vessel is made of pyrex glass cylinder incorporating stainless steel top-plate with ports for various entries. Hollow baffle type heat exchanger serves to control the culture temperature as a baffle and air sparger Provision for interchangeable sparger and stirrers make this equipment most flexible to handle. Its fully modular electronic control system controls such parameters as rpm, air flow pH, dissolved oxygen, and foam/continuous culture and indicates in a digital meter which can be connected to a recorder.

For further information write to Murhopye Scientific Company, B-11, Metagalli Industrial Estate, Mysore, Karnataka 570 016.

(Invention Intelligence 24(4), 1989, 160)

134 Solar energy used for alcohol distillation from sweet sorghum

A pioneering effort on production of industrial alcohol from sweet sorghum using solar energy has been made at Nimbkar Agricultural Research Institute (NARI), Phaltan, Maharashtra.

A pilot plant, the first in Asia, capable of producing between 30-50 litres/day of 90-95% v/v pure industrial grade alcohol, running completely on solar energy, has been set up at the Institute's campus. The plant consists of 38 m^2 flat-plate solar collectors, 2,150 litre hot water storage tank, and 5.5 m long distillation column. Nearly 75% of the total energy required for distillation comes from solar energy, the res being taken care of by fossil fuel. The project was supported by Department of Non-conventional Energy Sources (DNES), New Delhi.

The innovative feature of the project is the development of complete technology of alcohol production from sweet sorghum, Sorghum bicolor L. (Moench).

Work on sweet sorghum was initiated at NARI in early seventies. The local sorghum varieties were crossed with sweet sorghum germplasm varieties from USA. Thus, at present, NARI has around 20 good varieties and 4 hybrids of sweet sorghum. One can get from these varieties about 2 tonnes/ha/season of grain and 1000-2000 litres/ha/season of alcohol.

Sweet sorghum is an arid region crop and one can have 2 crops/year with much less of water (about 25% only) than is required for sugarcane. NARI scientists have produced varieties which are high sugar yielding and from which excellent jaggery has been produced.

Alcohol from sweet sorghum can replace kerosene for cooking and lighting. Scientists at NARI have already produced efficient lanterns and stoves based on alcohol. "The potential of alcohol from sweet sorghum as automotive fuel is also tremendous".

At present NARI is engaged in designing minidistilleries of 5000 litres/day.

The development of this technology was a team effort. Mr.Rajiv Jorapur and his team were instrumental in developing the distillation technology while Mr.A.R.Ghanekar and Dr.Nandini Nimbkar were responsible for developing sweet sorghum varieties. Efforts are also underway to develop an improved jaggery making technology for sweet sorghum.

(*Invention Intelligence* 24(3), 1989, 110)

135 Fruit mill (fruit shredder)

The Temp-X multi-purpose machine is suitable for fruit, dairy and food industries. It can be used for grape cutting in beverage industries; tomato shredding for sauce chatni plants; guava cutting for pulp making; onion shredding for chatni preparation; casein grinding and shredding either wet or dry in dairy industry; dry fruit cutting to standard pieces in ice-cream plant; and groundnut shredding to fluffy mass for making sweets. With flexible attachment it is possible to shred coconut, potato, cashew nuts, cake and the like. It is also used for mixing dry powder to cereals and tea ingredients. The machine is portable, motorised 1HP x 900 RPM, mounted on a table.

For more details write to: Shriram Temp-X-Changers (India), 991/2/A, GIDC Opp. Makarpura Bus Depot, Vadodara, Gujarat 390 010.
(*Chemical Products Finder* 7(10), 1989, 32)

136 Mixing equipment

Navayug Industrials manufactures mixing equipment in SS 316/304. The mixers have 750 to 6,000 RPM due to which substantial saving in reaction time can be achieved. Conventional mixers consume more electricity as it is used to move whole mass. These mixers carry out mixing on unit load which requires less energy ensuring appreciable savings in electricity. Moreover, due to the inbuilt arrangement of blades, the particle size of the end product is maintained as required, which automatically takes care of agglomeration. Maximum possible dispersion also means minimum dispersed raw materials for the same effect. These mixers can be fitted on pressurised or non-pressurised vessels on reaction carried in vacuum. These are used in mixing, dissolving, suspending, homogenising, wet grinding for application in industries such as chemical, pharmaceutical, food and confectionary. These mixers can be used for batch process from 50 to 3,000 litres volume or on continuous process. The company also undertakes manufacture of special purpose stirring arrangements that can be fixed on reaction kettles.

For more details write to: Navayug Industrials, 23 Govt Industrial Estate, Kandivli (West), Bombay 400 067.
(*Chemical Products Finder* 7(10), 1989, 63)

137 Hygienic centrifugal pumps

Raj Engineers offers a new series of Hygienic Centrifugal Pumps, suitable for use in food, beverages, breweries, dairy, pharmaceutical, chemical and other process industries. All the components that come in contact with liquids are made out of high quality stainless steel. The bearing frame oil chamber provides constant lubrication to the bearings. When pumping products with high temperature,asteam jacketed cover can be fitted to the transfer cooling system to maintain the product set up. These pumps feature uniformity in overall dimensions and can be changed over from gland packing to mechanical seal with standardised conversion. All pumps are fitted on portable trolley stand with electric motors for easy movement in the plant to connect for ultimate use with other tanks and vessels. They are available or obtainable in nine standard port sizes from 20 to 50 mm, in open, semiopen and closed type impellers having discharge capacities from 6000 to 80,000 LPH.

For more details write to: Raj Engineers, S/3, Raj Rajeshwari Apartment, Narayan Nagar, LBS Marg, Ghatkopar (West), Bombay 400 086.
(*Chemical Products Finder* 7(10), 1989, 67)

138 Powder sifter

The Rota-Sift is a centrifugal unit used for the continuous separation of dry or moist materials, even those that tend to ball or agglomerate. It can handle a variety of chemicals, pharmaceuticals, foods, dairy products, animal feed and powders of granules. Material is uniformly fed into the cylindrical sifting chamber by means of a feed screw which discharges the material into a rotating helical paddle. Centrifugal force accelerates the movement of the particles against the screen. The rotating paddles which do not contact the screen, break up soft agglomerates and propel individual particles through the screen. Oversized particles, hard lumps and trash are ejected and pass directly to the discharge spout. The separating media can be nylon, woven wire meshes or perforated screens. Features include dust-free operation, quiet vibration free action, quick screen change, easy cleanability, and large inspection doors.

For more details write to: Age Technologies Private Limited, 712 GIDC Makarpura, Vadodara, Gujarat 390 010.
(Chemical Products Finder 7(10), 1989, 71)

139 Synthetic filter cloth

SIC offers synthetic filter cloth made from nylon, polypropylene, polyester, and HDPE for use in industries such as dyes and chemicals, food and fertilisers, tea and beverages, oils and soaps, paints, cements, etc.

For more details write to: Sigma Industries Corporation, 82, Narayan Dhuru Street, Bombay 400 003.
(Chemical Products Finder 7(10), 1989, 106)

140 Filtration in the brewing industry

The filtration of fully fermented beer, following a period in cold storage, is widely practised as a two-stage operation with final sheet filtration. The first or roughing out stage, serves to free the beer from visible turbid matter or, in other words, to take the heavy work load. This operation is best carried out with kieselguhr as the filter medium, in equipment with the capacity to accept the cake that builds up in the course of filtration cycle. The modern filter press is a highly versatile unit, functioning effectively as either a kieselguhr or a sheet filter, with the ability to accommodate both these stages of filtration within a single filter. Carlson washable type W2 support sheets are available for the kieselguhr process. In double form, they are suspended over the outlet collection plate to capture the filter aid; precoat and filter bed are deposited upon the surface of the W2 sheet and build up in the inlet frames on either side of the outlet plate. The filter is cleaned out at the end of the cycle and the sheets used again. Specially developed for this purpose, W2 sheets are pure cellulose, incorporating wet strength resins within the matrix to improve the durability and produce a high wet strength sheet. The features of the W2 filter sheet support system are: bed stability due to the texture of the supporting medium; the depth effect of the support medium ensures minimal danger of bleedthrough of the finest of fines; and toleration of pressure transients during the filtration cycle. Where asceptic or sterile filling is in operation and the duty is the removal of micro-organisms which must not remain in solution if the beer is to have the required degree of biological stability, filtration should be carried out through sheets from the sterilising group such as NA130 or XE675. Flow rate here would normally be confined to 1.5 hectolitres m^2/hr. Long term stability of beer have become of greater significance in recent years, and the problem of achieving stability in lighter-flavoured and lighter-coloured beers has made the process even more critical. One of the major approaches to this problem has been by the use of a special sheet viz PROP4 impregnated with polyvinylpolypyrrolidone (PVPP).

For further information write to Pharma Machines Sales and Services, Star Metal Compound, L.B.S. Marg, Vikhroli Bombay 400 083.

(Chemical Products Finder 7(11), 1989, 105)

141 Induction cooking system

Induc'Chef, a French system of induction cooking, has recently been marketed after four years of extensive testing in real conditions. In kitchens of hotel management schools or hospitals, in prestigious restaurants or staff canteens, the induction cooking (based on the principle of production of heat through electromagnetic waves) has conquered the chefs who tested this new material.

Unlike the conventional cooking appliances, where the container is heated by thermal conduction, the induction plate works with power from the mains and heats the food by electromagnetic waves. An inverter transforms the current and creates a magnetic field, which, through contact between the ferrous bottom of the container and a simple copper resistance, produces the heat. Only the bottom and walls of the casserole are heated. As soon as the container is removed from "fire", the plate stops working.

Induction cooking has several advantages: fast cooking (a litre of water can brought to boil two to four times faster), comfort and hygiene (very little heat emanation in the kitchen), flexible and precise use thanks to the electronic system which allows to select the heating power accurate to within 1 per cent, as well as the duration of cooking by simple pressing on the digital keyboard. The chef, if he so wishes, can shift abruptly from boiling to simmering.

As the plate is not the heating element, the safety of Induc'Chef is total: no risk of burning, nor of fire caused by discharges of hot oil on the appliance. The plate works only if the casserole or dish is of sufficient metallic mass. Combining an exceptional energy efficiency of 92 per cent (70 per cent for electric plates and 50 per cent for gas burners), an immediately available heat and a great flexibility of use, the induction cooking system is a true technical advance.

The production of induction tables for general public has started in 1988, and this year, with a price equivalent of about 15,000 Rupees each, 25,000 appliances are expected to be sold in France only.

(P.T.I. *Science Service* 8(6), 1989, 15-16)

PACKAGING

142 Film keeps fruit fresh

Shrinkfilm overwrap on fruit and vegetables has enabled a US company to increase sales.

"Spoilage is a big problem with fruits and vegetables", says Ken Johnson, president of Fresh Dimensions, Tempe, Arizona. "Up to 15 per cent of items that reach retailers are lost due to delay, weight reduction, poor quality and appearance. This is not the case with produce wrapped in shrink film".

Mr.Johnson adds that over-wrapping also gives customers a higher quality impression. "In test markets, sales of our potatoes actually doubled after they were wrapped with shrink film".

Fresh Dimensions is using Du Pont's Clysar, an IIdpe film, said to offer high clarity, good shrink characteristics and good moisture and oxygen resistance. It is heat sealed for a tight and secure closure.

For further information write to: Du Pont (UK) Ltd., 105 Wigmore Street, London W1H, OEL tel: 01-408 6362.
(Packaging News December 1988, 14)

143 Specification for flexible packs for edible oils

The Bureau of Indian Standards has brought out an Indian Standard Specification IS: 12265-1987 for flexible packs for packing edible oils. It covers the requirements for flexible pouches made of thermoplastic films or their combinations with other flexible materials used for the retail packing of edible oils in quantities of 100 gm, 500 gm and 1 kg.

To ensure safe carriage of contents in all weather conditions, the Standard provides for stack load test, drop test, and vibration test. Under the stack load test, the pouches duly filled in and sealed are subjected to a uniformly distributed load for 72 hr at ambient temperature. Thereafter, the pouches are examined for any leakage at the seams or bursting.

The drop test provides that each pouch duly filled in and sealed is to be dropped on a flat, smooth and hard surface from a height of 1.2 m. Each pouch is examined for any leakage after the test.

In the vibration test, the samples of pouches kept on the vibration table are subjected to vibrations for 40 minutes by running a motor, and any leakage of oil through the seams is observed either during or after the test.

The shelf life of contents packed in pouches is specified as 120 days.

(*Invention Intelligence* 24(4), 1989, 158)

ANALYSIS

144 New light on bitter taste

Bitter tastes are rather different from the other kinds of taste we perceive sweet, salty or sour, Not only are they less pleasant, even at low concentrations, but they help us to avoid hazardous foods.

The surface of the tongue responds electrically to sweet salty or sour tastes, the electrical change results in a response in the gustatory (taste) nerve. But bitter tastes provoke no such currents.

Now researchers, Mike Akabas and his colleagues at Columbia University (New York) have found that bitter tastes result in a rise in calcium concentration inside some cells. The researchers first separated out groups of cells from the tongues of rats. They then identified them as taste cells by measuring the response of the cells to a change in the electrical potential across their membranes. The taste cells but not other cells on the tongue responded by producing electric current across the membrane.

The researchers then looked at how the cells responded to bitter tastes, using denatonium chloride, a substance that tastes extremely bitter to humans. One or two cells in each group responded to denatonium by doubling their levels of calcium whereas the other taste cells did not. None of the cells responded with a change in calcium to a sweet stimulus, so the response received specific to bitter taste.

The levels of calcium inside nerve cells normally rise when there is a change in electrical potential across the membrane. The rise in calcium, in turn leads to the release of a neurotransmitter that the researchers suggest delivers a 'bitter' message to the gustatory nerve, but the responsive cells differed from ordinary nerve cells; changes in electrical potential, the researchers found, made no difference to those cells. Calcium levels rose regardless of a change on potential.

The detection of bitter tastes, the researchers suggest, relies on biochemical changes inside the taste cells, instead of the more usual electrical changes. Molecules of the bitter substance probably attack receptors on the membrane of taste cells, once attached, they could activate a chemical message inside the cells, which promotes the release or calcium. Whatever that chemical message is, it makes bitter substances taste different.

(Chemical Weekly 34(35), 1989, 83)

COMMERCIAL INTELLIGENCE

PRODUCTION (Raw Material)

145 Ginger production

India is the largest ginger-producing nation in the world, accounting for about 50 per cent of the world's total production.

India is the largest exporting country also and earns a considerable sum in foreign exchange.

Prior to 1974-75, India did not export ginger oil. In 1975 the export was only 100 kg but rose to 15 tonnes in 1985, earning foreign exchange worth Rs. 1.2 crore.

(The Times of India 26 April 1989, 9)

146 Milk production up

Milk production in the country has gone up to 46.1 million tonnes in 1987-88. Correspondingly, per capita availability has also gone up from 132 grams per day to 158 grams per day.

This spectacular success is mainly due to Operation Flood (OF).

The recent decision to set up a technology mission for dairy development headed by the National Dairy Development Board Chairman, Mr.V.Kurien, is a clear indication of the Centre's determination to build upon the experiences accrued from OF I and II. The mission, through OF III, envisages raising the total milk production to 61 million tonnes and the per capita net availability to 186 grams per day by 1995. By that time, the milk yield of cows will be increased by 64 per cent from 390 litres to 640 litres and that of buffaloes by 12 per cent from 910 to 1,020 litres per year. In the long run, the government hopes to increase production to 70 million tonnes a year by 2000 AD to meet the projected demand of 60 million tonnes.

Under the mission, the number of cooperatives would increase from 49,007 in 1987 to 70,000 through OF III, and the state governments would be asked to organise an additional 80,000 cooperatives, thus covering 270 districts by the middle of the next decade. Daily milk procurement is expected to virtually double to 15 million litres and milk marketing would rise by 74.42 per cent to 15 million litres from the present 8.6 million litres. The processing capacity will also be raised to 22 million litres by 1995 against 11.7 million litres in 1987.
(Economic & Commercial News 19(7), 1989, 13)

EXPORT

147 Cashew kernels export slumps

India's export of cashew kernels declined to 31,892 tonnes during January-December, 1988 from 38,598 tonnes in the previous year.

Similarly, export earnings also decreased to Rs. 257.27 crores from Rs. 340.29 crores during the period under review. The unit price realised was only Rs. 80.67 per kg compared to the previous year s Rs. 88.16.

Strong competition from Brazil, lower imports of raw cashew and fall in kernel prices in the international market and Kerala Governments monopoly procurement were the reasons for the poor export performance.
(Financial Express 25 March 1989, 8)

148 Chillies export

Pakistan is likely to import 5,000 tonnes of chillies immediately for which it had made enquiries with India.

The enquiries followed reports of a possible 60% damage to chilli crop this season in Pakistan owing to a mysterious disease according to "Spices Market", a weekly publication of the Spices Board.
(Financial Express 25 March 1989, 8)

149 Export of dry chillies from India .

Year	Quantity (Metric tons)	Value (000 Rupees)
1985-86	1241.1	20202.9
1986-87	4327.0	49580.0
1987-88	6122.0	83345.0

Source: Customs Lists

(Spices News Letter 23(3), 1989, 34)

150 Marine goods export up by 11 p.c.

Sea food exports touched an impressive figure of Rs.5,900 million during 1988-89 despite stiff competition from Asian rivals including China, Thailand and Taiwan. This compares with exports worth Rs. 5,312 million in 1987-88 and represents an increase of 11 per cent.

This is the third consecutive year that the export of these products have maintained a steady rise. Marine products are one of the 14 thrust items identified for export.

Export of marine products peaked to Rs. 5,312 million in 1987-88. In the previous year, 1986-87, exports were Rs.4606.7 million. In terms of quantity, exports increased from 85843 m.t. in 1986-87 to 97179 m.t. in 1987-88 and during 1988-89 quantity-wise exports from April to January 1989 increased by 6.28 per cent.

Frozen shrimps constitute a major portion of India s exports of marine products accounting for a share of 57 per cent, while the other items are frozen lobsters, frozen cuttlefish and fillets, frozen squids, dried fish, shark fish and fish maws. Japan has been the largest market followed by US, the UK, France, Spain, Singapore, Netherlands and Sri Lanka *(Economic and Commercial News 19(17), 1989, 3-4)*

151 Betal leaves

Export of betal leaves from India in 1987/88 was worth Rs.17 lakhs, the minister of State for Commerce, Mr.Dasmunshi informed the House.
(The Economic Times 29 April 1989, 6)

152 HPS groundnut exports

After more than a decade, India is again making its presence felt significantly in the world market for HPS (hand picked selected) groundnut.

In the current year, this traditional item of export is expected to fetch over Rs.100 crores. This would be a record export earning as last year the commodity could hardly earn Rs.5 crores in foreign exchange.

Till March 31, export contracts for 52,000 tonnes valued at about Rs. 46 crores have been concluded. Exporters here feel that another 50,000 tonnes could be easily be sold in the current year.

This is possible as the country has a bumper crop this year following good monsoon. The Saurashtra region, known as the groundnut bowl of the country, received adequate rainfall during the season.

Out of the total kharif oilseed output of 88 lakh tonnes, 75 lakh tonnes were groundnut (in shell). The rabi crop is estimated at 20 lakh tonnes (in shell) making the season's total groundnut production 77 lakh tonnes.

Due to good weather, the quality of the nut produced is good and also free from aflatoxin, a major problem about which the foreign buyers are more concerned. According to reports reaching here from overseas centres, buyers are quite satisfied with the quality of Indian goods.

A significant development this year is the exploitation of new markets. The export monitoring agency for HPS groundnut - the Indian Oil and Produce Exporters Association (IOPEA) has initiated a vigorous drive to tap non-traditional markets.

An IOPEA delegation which visited for eastern countries recently made contracts for exporting substantial quantity to non-traditional markets.

Last November, the Government gave five per cent cash compensatory support (CCS) for HPS groundnut. However, exporters here feel that it is too inadequate. IOPEA has already sought increased rate of CCS in view of the bright export prospects.

During 1975-76, Indian export of HPS groundnut were at its peak - about two lakh tonnes valued at Rs.100 crores then. That was the golden period when India had 40 per cent share in the world market.

(*Financial Express* 4 April 1989, 11,

153 Export potential of deoiled meals to far East

Far eastern markets offer a great potential for the export of deoiled meals from India during the current years as China, the major supplier of these markets, is passing through serious drought conditions.

Further, China is developing its feed milling industry, therefore, its export of protein material is expected to gradually come down to far Eastern countries in next two to three years

These are some of the findings of a high level delegation of the Solvent Extractors Association of India, led by association president Mr. H.P. Gupta. The 7-member mission sponsored by the Union ministry of commerce had visited Singapore, Kuala Lumpur, Jakarta, Manila, Tokyo, Seoul; Taipei, Hong Kong, Bangkok and Colombo during its three-week extensive tour, during which they met nearly 200 representatives of feed millers, importers and government officials.

The objective of the mission was to study the feed mill industry in those countries and explore the markets for Indian deoiled cakes (extractions) and also to study the latest technology developed in vegetable oil industry in far East countries.

There was small export of Indian deoiled cakes to some of these countries, but many of the large importers were not aware of our capabilities of supplying various protein materials ranging from 16 per cent profit in rice bran extraction to 54 per cent in groundnut extraction. As a matter of fact India is the only country which has the largest basket of protein supplements at different protein levels and at varying price levels to suit every feed millers' requirement, according to SEA delegation.

Further, Indian oilseeds crop has increased substantially enabling it to become a potential supplier of proteins, provided the country can maintain quality, regular shipment and continuous liaise with feed millers and importers of deoiled meals. This is the right time for India to capture the far Eastern markets and the government should not hesitate in granting 20 per cent CCS on export of deoiled meals to penetrate in these new markets, the mission suggests.
(*The Economic Times* 13 April.1989, 3)

154 Registration with Spices Board

The government has made it compulsory for exporters of spices and cardamom to register their contracts with the Spices Board, Ernakulam.

Exporters, who are already registered with the Spices Export Promotion Council and the Cardamom Board, holding valid registration-cum-membership certificates issued by them will be deemed to have been registered with the Spices Board. Renewal of the certificates will be decided by the Spices Board, according to a recent trade notice issued by the chief controller of imports and exports.

The importance of monitoring of spices exports can hardly be overemphasised in view of our rapidly growing overseas trade as also the increasing competition in the international markets.
(*The Economic Times* 22 April 1989, 6)

155 Cell for exporters' grievances

A general clearing house system to process grievances of exporters is proposed to be set up. It will comprise representatives of the Federation of Indian Export Organisations (FIEO) and the office of the Joint Chief Controller of Imports and Exports (JCCI and E)

Mr.Tejendra Khanna, Chief Controller of Imports and Exports (CCI and E), said this would provide for greater interaction between exporters and governmental agencies and the members could meet every 15 days to sort out various procedural bottlenecks.

Assuring the participants support services, Mr.Khanna said the present delays would be cut down with thrust on services to the exporter.

Pointing out that exim policies had several "angles and tangles" he said it was clear that all support should be given to the exporting community.

On exporters complaints over classification problems for the purpose of determining cash compensatory support (CCS), Mr.Khanna said with both the Commerce and Finance Ministries agreeing to the harmonisation between trade and customs classifications, a common code for trade and customs policies should be evolved within the next three to four months.
(Financial Express 7 March 1989, 1)

TRADE INFORMATION

156 New BIS offices established

Four new offices of the Bureau of Indian Standards (BIS) have been established at Faridabad, Ghaziabad, Coimbatore and Vadodara to strengthen certification and propagation of standardisation and quality systems at different industrial centres in the country.

This was stated by Mr. Sukh Ram, Minister of State for Food and Civil Supplies, while presiding over the fourth high-level meeting of the Bureau here on Wednesday

He said a branch office of BIS is also proposed to be opened at Srinagar shortly.

(Financial Express 25 May 1989, 10)

157 National fisheries board to be set up

The Government has decided to set up a National Fisheries Development Board on the pattern of the National Dairy Development Board with the aim of giving a boost to the marine industry with its high potential for exports.

Despite the country having a 1,715 km-coastline and over 2 million square kilometres as its exclusive economic zone, the fishing sector is in troubled waters. Barely 42 per cent (about 1.9 million tonnes) of the annual marine catch potential of 4.5 million tonnes is being exploited and, of this, only 5.25 per cent is exported.

In 1987-88, shrimps accounted for over 57 per cent in quantity and a whopping 80.15 per cent in value of India's marine exports. As a result export earnings have largely hinged on the international prices for shrimps.

While the value of shrimp exports has risen by 29 per cent between 1985-86 and 1987-88, the actual rise in the quantity exported during the same period was only 10.7 per cent.

(Deccan Herald 9 March 1989, 14)

158 International Spice Group office

The office of the International Spice Group (ISG), a body constituted under the aegis of the International Trade Centre (ITC), Geneva and the Commonwealth secretariat, will be located in Cochin, reports UNI & PTI.

This was decided at the second meeting of the group held in Singapore from March 6 to 11.

Union commerce ministry joint secretary Sivaraman and Spices Board chairman K.M. Chandrasekhar were among a five-member delegation which represented India at the meeting.

The meeting considered the current functioning of the ISG in the light of the wish of the Commonwealth secretariat and the ITC to hand over the secretariat responsibility to the group.

(The Economic Times 16 March 1989, 3)

159 Broad-banding for processed foods

The Union Government has brought all fruit and vegetable products along with processed foods, excluding the items reserved for small sector, under the broad-banding scheme in its bid to simplify procedures and policies, to encourage greater flexibility in production and help in the utilisation of capacity. Fruits and vegetable products and other processed foods under the purview of Scheduled Industry 27(1) and 27(5) of the First Schedule of 1(DR) Act, 1951, will be covered under the scheme.

The broadbanding facility will be available to all industrial undertakings, including MRTP/FERA companies.

(Industrial Products Finder 17(6), 1989, 113)

160 Tax policy on processed food

Processed food is not a luxury item and taxation policies should be re-oriented keeping this in focus according to a study conducted by the PHD Chamber of Commerce and Industry, reports UNI.

The study says that it is essential to recognise that processed food is a food item meant for mass consumption. Re-orientation of policies based on this recognition would give the necessary fillip to the industry.

The study pointed out that some of the main constraints faced by the industry were the high cost of raw materials in view of the low agriculture productivity, high incidence of taxation ranging from 30 to 60 per cent on the finished products, high cost of packaging which accounts for about 20 per cent of the exfactory price of some finished products, low technology base and inadequate infrastructural facilities.
(*The Economic Times* 17 April 1989, 5)

161 Consignment tax on biscuit

Federation of Biscuit Manufacturers of India (FBMI) has expressed concern over the proposed Consignment Tax (CT) The Federation states that not much attention has been paid to the severe economic consequences of raising revenue by this form of tax. The proposed consignment tax may collect some Rs. 2000 crores yearly from the public against around Rs.3660 crores of income tax.

According to Mr.S.P. Chauhan, president, FBMI consignment tax like Central Sales tax, will be imposed at four per cent whenever there is an interstate movement. Thus, a factory in state A will have a four per cent price advantage in its own state versus a competitor from state B. In state B, the position gets reversed. So, to be competitive, both companies will need factories in both states. Therefore, a company selling its products nationally will need 30 factories, one each for 30 states and Union territories.

He said, CT was thus an interstate tariff barrier, fragmenting markets and therefore industries. Such industries cannot reap economies of scale. Cost per unit of output and therefore price to the public will go up.

Mr.Chauhan said besides making our industries uncompetitive abroad, CT will restrict domestic competition to the detriment of the consuming public. This is because manufacturers with small market shares cannot afford viable factories in other states and therefore will get priced out of them.
(*The Economic Times* 13 April 1989, 3)

162 Credit facility under Modvat extended

The notional credit facility under the Modvat scheme for user industries has been extended up to March 31, 1990 The scheme was earlier applicable up to March 31, this year, according to an official release.

Under the Modvat scheme, the duty paid on inputs is available as credit for payment of duty on the finished products. The extent of credit is equal to the duty actually paid on the inputs.

For inputs received from small-scale units, which have discharged duty at a concessional rate (under the general small-scale exemption scheme), the user industry is allowed to take a notional higher credit of five per cent ad valorem.

The government had earlier notified that this facility of taking notional higher credit would be in force up to and inclusive of March 31, 1989. It has now decided to extend the facility for one more year.
(*The Economic Times* 3 April 1989, 1)

163 Financial assistant to fruit and vegetable processing industry

Food processing: The Government has made a plan provision of Rs.1.6 crores for 1989-90 for providing financial assistance to State Governments and co-operatives for the development of fruit and vegetable processing industries.

The Minister of State for Food Processing Industries, Mr.Jagdish Tytler, told the House in a written reply that the

Government had not provided any financial assistance to encourage and promote the industry in the special category States in 1988-89.
(*Financial Express 7 April 1989, 6*)

164 Technology Mission on dairy development

The Government has decided to establish a Technology Mission on Dairy Development.

The major objective of the Mission would be to consolidate the achievements of the cooperative dairy sector using the infrastructure already established under Operation Flood taking the milk production 61 million tonnes by 1995 from the level of 44 million tonnes in 1986-87. With this, the per capita availability of milk would go up from 158 gms/day in 1986-87 to 186 gms/day in 1995.

This was disclosed in the Rajya Sabha recently by the Minister of State for Agriculture, Mr.Shyam Lal Yadav.

The Mission would aim at extending the dairy cooperative structure to 270 districts by 1995 and improving average annual yield of milk per animal within the project area.

In fine with the National Breeding Policy, the Technology Mission will lay stress on improving milk production through upgrading of nondescript Indian buffaloes and selective breeding of important breeds of cow and buffaloes; cross breeding of nondescript cattle with exotic breeds; development of acceptable system of culling of inefficient animals; and adoption of improved technologies like frozen semen, embryo transplant, genetic engineering etc. for gaining quicker results.
(*Economic and Commercial News 19(12), 1989, 11-12*)

165 West German market for spices - information source

The German Market for Spices on 84-page booklet giving up-to-date information about the spice trade and requirement in West Germany, has been published by the Indo-German Chamber of Commerce. Priced at Rs.75, it gives distribution system, trade requisition, West German Food Laws, specific trade fairs and list of importers and associations for building up trade contacts.

West Germany is the largest market for spices in Europe and the second largest in the world after USA. Consumption trends indicate pepper is still the main item imported in terms of both quantity and value, followed by paprika, nutmeg and cumin. By any standard, this booklet is a valuable reference book for exporters in India.
(*Chemical Weekly* 34(27), 1989, 82)

166 Process for producing fat and cholesterol-free meat

An Australian breakthrough in meat processing, said to reduce fat levels in meat by 96% and cholesterol levels by at least 30%, has attracted interest from several of the world's major food processors. Executives from a Japanese food processing company have visited Chapman Meats (Australia) in Adelaide last November to study and evaluate the process developed by the company. The first international showing of the company's new range of meat products was at Foodex in Tokyo in March 1988, followed by a display at the Food Marketing Institute's Convention in Chicago in May 1988. The company offers manufacturing licence rights.
(*Chemical Weekly* 34(27), 1989, 82)

167 Food processing prospects

Several foreign companies especially from the US, West Germany and Italy are keen on joint ventures in the field of food processing, Mr. Jagdish Tytler, Minister for Food Processing Industries said here.

Mr.Tytler said these firms have sought Government's permission and his Ministry is studying the proposals and will be cleared on merit.

The Minister was speaking after inaugurating the new food division of Parle Exports.

Later in an informal chat with newsmen, Mr.Tytler said the Coca Cola proposal would be cleared if they offered the same commitments as offered by its competitor, Pepsi.

The Minister said the Government is considering further fiscal reliefs to food processing industry. The processed foods need to be given tax reliefs as various duties on them now accounts for over 55 per cent of their selling price. His Ministry would take up this matter with the Finance Ministry, he said.

The Food Processing Ministry is currently undertaking several projects which would result in a saving of about Rs.2000 crores in a couple of years. These are in the areas of better packing for fruits and vegetables, procuring fruits and vegetables from farmers especially in hilly and remote areas, encouraging processing of seasonal fruits and vegetables.

In this context, the Minister also said that the Government is encouraging the setting up of high-tech cold storage unit in the private sector with foreign technical collaboration. *(Financial Express 16 April 1989, 1)*

FOOD REGULATION, QUALITY CONTROL AND HYGIENE

168 Rice milling industry (Regulation and Licensing) Amendment Rules, 1988

G.S.R. 807 (E) Amendment Rules 1988:- Whereas the draft of certain rules further to amend the Rice Milling Industry (Regulation and Licensing) Rules, 1959, was published as required by sub-section (1) of section 22 of the Rice Milling Industry (Regulation) Act, 1958 (21 of 1958) in the Gazette of India Extraordinary Part II Section 3, sub-section (i) dated the 28th April, 1988, under the notification of the Government of India in the Ministry of Food and Civil Supplies

(Department of Food) No.G.S.R.512(E) dated the 28th April 1988, inviting objections or suggestions from all persons likely to be affected thereby before the expiry of a period of forty-five days from the date on which the copies of the Official Gazette in which the said notification was published were made available to the public;

And, whereas, the said Gazette was made available to the public on the 11th May, 1988;

And whereas, the objections and suggestions received from the public on the said draft have been considered by the Central Government;

Now, therefore, in exercise of the powers conferred by Section 22 of the said Act, the Central Government hereby makes the following rules further to amend the Rice Milling Industry (Regulation and Licensing) Rules, 1959, namely:-

1.(1) These rules may be called the Rice Milling Industry (Regulation and Licensing) Amendment Rules, 1988.

(2) They shall come into force on the date of their publication in the Official Gazette.

2. In the Rice Milling Industry (Regulation and Licensing) Rules, 1959, in the Schedule, in Form IV, in clause 3 in condition (3D) -

(i) in the first proviso, for that words "thirteen years and three months", the words "sixteen years and three months" shall be substituted;

(ii) in the second proviso, for the words and figures "31st July, 1988", the words and figures "31st July, 1991" shall be substituted.

(File No.15/2/88-D&R.I)

N.P.NAWANI, Jt.Secy.

(The Gazette of India No.400, Part II-Section 3-sub-section (i), 1988, 2)

169 Child labour (Prohibition and Regulation) Rules 1988

G.S.R.847(E):- Whereas the draft of certain rules was published as required by sub-section (1) of section 18 of the Child Labour Prohibitions and Regulation) Act, 1986 (61 of 1986), in the Gazette of India, Extraordinary, Part II, Section 3, Sub-section (i), dated the 8th October, 1987, under the notification of the Government of India in the Ministry of Labour, No.G.S.R. 845(E), dated the 8th October, 1987, inviting objections and suggestions from all persons likely to be affected thercby till the expiry of a period of thirty days from the date of publication of the said notification in the Official Gazette;

AND WHEREAS the said Gazette was made available to the public on 4th November, 1987;

AND WHEREAS the objections and suggestions received from the public on the said draft have been considered by the Central Government.

NOW THEREFORE, in exercise of the powers conferred by sub-section (1) of section 18 of the said Act, the Central Government; hereby makes the following rules, namely:-

1. Short title and commencement: (1) These rules may be called the Child Labour (Prohibition and Regulation) Rules, 1988.

(2) They shall come into force on the date of their publication in the Official Gazette.

2. Definitions:- In these rules, unless the context otherwise requires -

(a) "Act" means the Child Labour (Prohibition and Regulation) Act, 1986 (61 of 1986);

(b) "Committee" means the Child Labour Technical Advisory Committee constituted under sub-section (1) of section 5 of the Act;

(c) "Chairman" means the Chairman of the Committee appointed under sub-section (2) of section 5 of the Act;

(d) "Form" means a Form appended to these rules;

(e) "register" means the register required to be maintained under section 11 of the Act;

(f) "Schedule" means the Schedule appended to the Act;

(g) "section" means a section of the Act.

3. Term of office of the members of the Committee; (1) The term of office of the members of the Committee shall be one year from the date on which their appointment is notified in the Official Gazette;

Provided that the Central Government may extend the term of office of the member of the Committee for a maximum period of two years;

Provided further that the member shall, notwithstanding the expiration of his term continue to hold office until his successor enters upon his office.

(2) The members appointed under sub-rule (1) shall be eligible for reappointment.

4. Secretary to the Committee: The Central Government may appoint an officer not below the rank of an Under Secretary to the Government of India as Secretary of the Committee.

5. Allowances to non-official members: The non-official members and Chairman of the Committee shall be paid such fees and allowances as may be admissible to the officers of the Central Government drawing a pay of rupees four thousand five hundred or above.

6. Resignation · (1) A member may resign his office by writing under his hand addressed to the Chairman.

(2) The Chairman may resign his office by writing under his hand addressed to the Central Government.

(3) The resignation referred to in sub-rule (1) and sub-rule (2) shall take effect from the date of its acceptance or on the expiry of thirty days from the date of receipt of such resignation, whichever is earlier, by the Chairman or the Central Government, as the case may be.

7. Removal of Chairman or member of the Committee: The Central Government may remove the Chairman or any member of the Committee at any time before the expiry of the term of office after giving him a reasonable opportunity showing cause against the proposed removal.

8. Cessation of membership: If a member :-

(a) is absent without leave the Chairman for three or more consecutive meetings of the Committee; or

(b) is declared to be of unsound mind by a competent court; or

(c) is or has been convicted of any offence which, in the opinion of the Central Government involves moral turpitude; or

(d) is, or at any time, has been adjudicated insolvent or has suspended his debts or has compounded with his creditors, shall cease to be a member of the Committee.

9. Filling up of casual vacancies: In case a member resigns his office under rule 6 or ceases to be a member under rule 8, the casual vacancy thus caused shall be filled up by the Central Government and the member so appointed shall hold office for the unexpired portion of the term of his predecessor.

10. Time and place of meetings: The Committee shall meet at such times and places as the Chairman may fix in this behalf.

11. Notice of meetings: The Secretary of the Committee shall give at least seven days notice to every member of the Committee of the time and place fixed for each meeting alongwith the list of business to be transacted at the said meeting.

12. Presiding at meetings: The Chairman shall preside at every meeting of the Committee at which he is present; if, however, the Chairman is unable to attend a meeting, any member elected by the members present among themselves shall preside at the meeting.

13. Quorum No business shall be transacted at a meeting of the Committee unless at least three members of the Committee other than the Chairman and the Secretary are present:

Provided that at any meeting in which less than three of the total members are present, the Chairman may adjourn the meeting to a date as he deems fit and inform the members present and notify other members that the business of the scheduled meeting shall be disposed of at the adjourned meeting irrespective of the quorum and it shall be lawful to dispose of the business at such adjourned meeting irrespective of the number of members attending the meeting.

14. Decision by majority: All questions considered at a meeting of the Committee shall be decided by a majority of votes of the members present and voting and in the event of equality of votes, the Chairman, or in the absence of Chairman the member presiding at the meeting, as the case may be shall have a second or casting vote.

15. Sub-Committees: The Committee may constitute one or more Sub-Committees, whether consisting only of members of the Committee or partly of members of the Committee and partly of other persons as it thinks fit, for such purposes as it may decide and any Sub-Committee so constituted shall discharge such functions as may be delegated to it by the Committee.

16. Register to be maintained under section 11 of the Act·

(1) Every occupier of an establishment shall maintain a register in respect of children employed or permitted to work, in Form A.

(2) The register shall be maintained on a yearly basis but shall be retained by the employer for a period of three years after the date of the last entry made therein

17. Certificate of age (1) All young persons in employment in any of the occupations set-forth in Part A of Schedule or in any workshop wherein any of the processes set-forth in Part B of the Schedule is carried on shall produce a certificate of age from the appropriate medical authority whenever required to do so by an Inspector.

(2) The certificate of age referred to in sub-rule (1) shall be issued in Form 'B'

(3) The charges payable to the medical authority for the issue of such certificate shall be the same as prescribed by the State Government or the Central Government, as the case may be for their respective Medical Boards.

(4) The charges payable to the medical authority shall be borne by the employer of the young person whose age is under question

Explanation for the purposes of sub-rule (1), the appropriate "Medical Authority" shall be Government medical doctor not below the rank of an Assistant Surgeon of a District or a regular doctor of equivalent rank employed in Employees' State dispensaries or hospitals.

FORM 'A'

(See rule 16(1))

Year................

Name and address of employer.........   Place of work......

Nature of work being done by the establishment ....

Sl. No.	Name of Child	Father's Name	Date of Birth	Permanent Address	Date of joining the establishment
1	2	3	4	5	6

Nature of work on which employed	Daily hours of work	Interval of rest	Wages paid	Remarks
7	8	9	10	11

FORM "B"

(CERTIFICATE OF AGE)

(See rule 17(2))

Certificate No.........

I hereby certify that I have personally examined (name) ....son/daughter of .... residing at...........................and that he/she has completed his/her fourteenth year and his/her age, as nearly as can be ascertained from my examination, is ....years (completed). His/her descriptive marks are................ ....

Thumb-impression/signature of Child..................

Place................

Date.................

Medical Authority
Designation
(File No.S-27025/59/86 CL)
Director

(MEENA GUPTA)

(The Gazette of India No.429, Part II - Section 3-sub-section (i), 1988, 4-6)

170 Spices Cess Rules, 1988

G.S.R.696(E)- In exercise of the powers conferred by section 5 of the Spices Cess Act, 1986 (11 of 1986), the Central Government hereby makes the following rules, namely

1. Short title and commencement (1) These rules may be called the Spices Cess Rules, 1988.
(2) They shall come into force on the date of the publication in the official Gazette.

2. Definitions:
In these rules, unless the context otherwise requires
(a) "Act" means the Spices Cess Act, 1986 (11 of 1986

(b) "Cess" means the duty of customs leviable under the Act;

(c) "Form" means a form appended to these rules:

(d) Words and expressions used and not defined in these rules but defined in the Act shall have the meanings respectively assigne to them in the Act

3. Furnishing of Statistical Information -

(1) Every exporter of spices shall furnish to the Spices Board every month a statistical information on export and cess paid on spices in the form and shall be verified by means of a declaration signed by the exporter of spices.

(2) The Statistical information in the form shall be furnished to the Spices Board on or before tenth of each succeeding month.

F.No.1/33/87-EP(AGRI.V))
M.R.SIVARAMAN, Jt. Secy.

FORM

(See rule 3)

STATISTICAL AND OTHER INFORMATION FOR THE MONTH OF ....19, IN RESPECT OF SPICES/SPICES PRODUCTS EXPORTED AND CESS PAID.

Name & Full Address of the Exporter.........	Month: (Based on date of shipment)
Telegraphic Address:	Spices Board Registration....
Telephone No.	Certificate number.
Telex No.	Date...........

Sl. No.	Number & Date of shipping bill passed	Date of shipment	Mode of shipment (by Sea/ Air/Land)	Indian port of Export	Foreign port of Import	Country of Import
1	2	3	4	5	6	7

Name of Spice/ spice product	Statutory Grade	Brand name if any	Unit of packing			Total Quantity (Kgs.)
			Kgs. (a)	Grams (b)	No of Packets (c)	
8	9	10	11			12

Total FOB Price (Rs.)	FOB Unit Price (Rs./Kg.)	Rate of Export Cess	Total Export Cess Paid (Rs.)	Rate of Export duty	Total Export duty paid (Rs.)
13	14	15	16	17	18

I/We declare that the information given above are true to the best of my knowledge and Belief.

Place: SIGNATURE OF EXPORTER

Date: (Office Seal)

Note:- Separate entry shall be made for each spice or spice products and grading thereof

(The Gazette of India No.326, Part II-Section 3- Sub-section(i) 1988, 3-4)

171 Ginger Grading and Marking (Amendment) Rules 1988

G.S.R. 8 - Whereas certain draft rules further to amend the Ginger Grading and Marking Rules, 1964, were published, as required by section 3 of the Agricultural Produce (Grading and Marking) Act.

1937 (1 of 1937), under the certification of the Government of India, Ministry of Agriculture (Department of Rural Development) G.S.R. number 207 dated the 3rd March, 1988, at pages 848-852 in the Gazette of India, Part-II, Section 3, Sub-section (i) dated the 26th March, 1988 inviting objections and suggestions from all the persons likely to be affected thereby, before the expiry of the period of fortyfive days from the date on which copies of the Gazette, containing the said notification are made available to the public;

And whereas the objections/suggestions received in respect public on 19.4.88;

And whereas the objections/suggestions received in respect of the said draft rules have been considered by the Central Government;

Now, therefore, in exercise of the powers conferred by section 3 of the said Act, the Central Government hereby makes the following rules further to amend the Ginger Grading and Marking Rules 1964, namely:-

RULES

1. (i) These rules may be called the Ginger Grading and Marking (Amendment) Rules, 1988.

(ii) They shall come into force on the date of their publication in the Official Gazette.

2. In the Ginger Grading and Marking Rules, 1964, -

(a) in rule 2, clause (2) shall be re-numbered as clause (6) thereof and before the clause (6) so renumbered, the following clauses shall be inserted, namely:-

(2) "Authorised Packer" means a person or a body of persons who has been granted a certificate of authorisation to grade and mark the commodity in accordance with the standards and procedure prescribed under these rules;

(3) "Certificate of Authorisation" means a certificate issued under the General Grading and Marking Rules, 1937, authorising a person or a body of persons to grade and mark the commodity with the grade designation mark;

(4) "Joint Agricultural Marketing Adviser" means Joint Agricultural Marketing Adviser (Quality Control) of the Directorate of Marketing and Inspection;

(5) "Regional Officer" means the Officer Incharge of the region of the Directorate of Marketing and Inspection"

(b) for rules 5, 6 and 7, the following rules shall be substituted, namely:-

5. "Grade designation mark" The grade designation mark shall consist of :-

(i) a label specifying name of the commodity, trade description, grade designation, and bearing a design consisting of a outline map of India with the word "AGMARK" and figure of the rising sun with the words "Produce of India" and "भारतीय उत्पाद" resembling the one as set out in Schedule 1-A;

(ii) "Agmark Replica" consisting of a design incorporating number of the certificate of authorisation, the word 'AGMARK name of commodity, grade designation and resembling the one as set out in Schedule 1-B.

Provided that the use of "Agmark Replica" in lieu of Agmark labels will be allowed only by such authorised packers who have been granted permission by the Agricultural Marketing Adviser or the Joint Agricultural Marketing Adviser in this regard and subject to the conditions as may be stipulated from time to time.

6. Method of marking - (1) The grade designation mark shall be securely affixed to or printed on each container in a manner approved by the Agricultural Marketing Adviser or the Joint Agricultural Marketing Adviser.

(2) In addition to the grade designation mark the following particulars shall be clearly and indelibly marked on each container:-

(i) Date of packing

(ii) Place of packing
(iii) Date of expiry (if applicable)
(iv) Net weight
(v) Lot number;

(3) An authorised packer may, after obtaining prior approval of the Joint Agricultural Marketing Adviser or the Regional Officer, mark his private trade marks on the containers in a manner approved by the said officer, provided that the private trade marks do not represent quality or grade of Ginger different from that indicated by the grade designation mark affixed to the container in accordance with these rules.

7. Method of packing - (1) The graded material shall be packed in clean, sound and dry containers such as jute bags, cloth bags, polywoven bags, paper bags, polythene, polypropylene or cellphane packs, metallised polyester or polythene laminated pouches, cardboard cartons, tin, glass or plastic containers, wooden cases or any other material as may be required by the buyer and/or approved by the Agricultural Marketing Adviser or Joint Agricultural Marketing Adviser.

(2) Suitable polythene or waterproof lining shall be used in packing or powdered material in jute bags, cloth bags or card board cartons etc.

(3) The containers shall be free from insect infestation, fungus contamination or any undesirable smell.

(4) Each package shall contain material of one grade designation only. Suitable number of small packs containing graded material of the same lot and grade designation may be packed in a large master container;

Provided that composite packing of consumers packs of different articles with varying grade designation in a single master container may be allowed against specific requirement of the foreign buyer and subject to the condition that each consumer pack shall carry appropriate grade designation mark and the details thereof shall be indicated on the tie-on label affixed to the master container.

(5) Each container shall be securely closed and sealed in a manner approved by the Agricultural Marketing Adviser or the Joint Agricultural Marketing Adviser in this regard;

(c) Schedule-I shall be renumbered as Schedule-1A and after the Schedule 1-A, as so renumbered, following Schedule shall be inserted, namely :-

"SCHEDULE 1-B

(See rule 5(11))

Design of "Agmark Replica"

(d) in Schedule III, V, VII and IX, for foot-notes 3 and 4, the following foot-note shall be substituted, namely:-

3. "Non-specified" is not a regular grade. It is provided to meet such specific requirements of the buyers which are not covered under the regular grades. It shall be allowed for export grading only against a specific order from the buyer indicating the quantity and quality required'

(c) for schedule X, the following Schedule shall be substituted namely:-

SCHEDULE-X

(See Rules 3 & 4)

Grade designation and definition of quality of ginger powder.

Grade Designation	Special Characteristics		
	Moisture percent by weight maximum @	Total ash percent by weight maximum	Ash insoluble in dilute HCL percent by weight maximum @
1	2	3	4
Standard	12.0	8.0	1.0

Contd....

Calcium as Cao percent by weight maximum.	Water soluash percent by weight maximum	Cold water soluble extract percent by weight minimum	Alcohol soluble extract percent by weight minimum	Volatile oil percent (V/W) minimum	General characteristics
5	6	7	8	9	10
2.0	1.7	10.0	4.5	1.0	The Ginger powder shall (a) be the material obtained by grinding clean, sound, mature and dried rhizomes of Zingiber officinale; Ros. (b) be free from added colouring matter or any foreign matter. (c) be free from mould growth, insect infestation or musty odour.
Non-specified*					

Explanations:

"Non-specified" is not a regular grade. It is provided to meet such specific requirements of the buyers which are not covered under the regular grades. It is allowed for export grading only against specific order from the buyer indicating the quantity and quality required.

@Moisture: A further tolerance of one percent will be allowed in respect of moisture during the monsoon period, i.e. from 15th May to 30th September.

NOTES:-

(1) Principal rules published in the Gazette of India. Part-II, Section-3, Sub-Section (ii), dated 28th March 1964 as S.O. 1047 on pages 1267 to 1277.

(2) First amendment published in the Gazette of India, Part-II Section-3, Sub-Section (ii), dated 19th December 1964, as S.O 4260 on page 4741.

(3) Second amendment published in the Gazette of India, Part-II, Section-3, Sub-Section (ii), dated 27th November, 1965, as S.O. 3631 on page 3822.

(4) Third amendment published in the Gazette of India, Part-II, Section-3, Sub-Section (ii), dated 18th November, 1967 as S.O. No. 4084 on pages 4322 to 4324.

(5) Fourth amendment published in the Gazette of India, Part II, Section 3, Sub-Section (i), dated 13th December, 1980 as G.S.R. 1278 on page 2527.

(The Gazette of India Part II - Section 3 - Sub-section(i) No.1, 1989. 43-44)

172 Prevention of Food Adulteration (Fifth Amendment) Rules 1988

G.S.R. 618 (E):- Whereas certain draft rules further to amend the Prevention of Food Adulteration Rules, 1955 were published as required by sub-section (1) of section 23 of Prevention of Food Adulteration Act, 1954 (137 of 1954), with the notification of the Government of India in the Ministry of Health and Family Welfare (Department of Health) G.S.R. 683 (E). dated the 31st July, 1987 in the Gazette of India Extraordinary, Part II, Section 3, Sub-section (i) dated the 31st July, 1987, at pages 1 to 6, inviting objections and suggestions from all persons, likely to be affected thereby before the expiry of sixty days from the date on which copies of the Gazette in which the said notification was published, were made available to the public;

And, whereas, the copies of the said Gazette were made available to the public on 31st July, 1987;

And, whereas, the objections and suggestions received from the public on the said draft rules have been considered by the Central Government;

Now, therefore, in exercise of the powers conferred by sub-section (1) of Section 23 of the said Act, the Central Government after consultation with the Central Committee for Food Standards, hereby makes the following rules further to amend the Prevention of Food Adulteration Rules 1955, namely:-

RULES

1. (1) These rules may be called the Prevention of Food Adulteration (Fifth Amendment) Rules, 1988.

(2) They shall come into force after a period of six months from the date of their publication in the Official Gazette.

2. In the Prevention of Food Adulteration Rules, 1955 (hereinafter referred to as the said rules), in Rule 4;

(i) for sub-rule (1), the following shall be substituted:-

"(1)(a) Samples of food for analysis under sub-section (2) of section 13 of the Act shall be sent either through a Messenger or by registered post in a sealed packet, enclosed together with a memorandum in Form I in an outer cover addressed to the Director.

(b) Samples of food for analysis under sub-section (2) of section 6 of the Act or under clause (a) of Rule 3 shall be sent either through a Messenger or by registered post in a sealed packet enclosed together with a memorandum in Form IA in an outer cover addressed to the Director";

(ii) for sub-rule (4), the following shall be substituted namely:-

"(4) On receipt of a package containing a sample for analysis, the Director or an officer authorised by him, shall compare the seals on the container and the outer cover with specimen impression received separately and shall note the condition of the seals thereon".

3. In rule 15 of the said rules, the following shall be omitted:-

(c) Name of the vendor "

4. In Appendix A to the said rules;

(i) After Form I, the following shall be inserted, namely:-

FORM IA
(See Rule 4(1))

From: ____

To

The Director,
Central Food Laboratory,

No.----------- Dated the------------------------

MEMORANDUM

1. I send herewith under the provision of section 6(2) of Prevention of Food Adulteration Act, 1954, or clause (a) of Rule 3 of Prevention of Food Adulteration Rules, 1955 Sample(s) of a food purporting to be ....for test or analysis and request that a report on the result of test or analysis may be supplied to the undersigned:

(1) Distinguishing No. on the container and outer covering

(2) Matter on which opinion required.

2. A fees of Rs. 40/- has been deposited in the Treasury

creditable under the "8658-Suspense-P.A.O. Suspense Transaction adjustable by Pay and Accounts Officer, Dte. General of Health Services, Ministry of Health and Family Welfare, New Delhi, and final adjustment under "Receipt Head-0210-Medical and Public Health-04-Public Health fees and fines" in his books" and treasury challan for the same is enclosed.

3. A copy of memorandum and the specimen impression of the seal used to seal the container and the cover are sent separately by Registered post

Customs Collector/Authorised Officer

(Seal)"

(2) In Form IV, after the words "Details of Food" the following shall be inserted, namely:-

"Code Number and Serial Number of Local (Health) Authority".

(3) For Form VIA, the following shall be substituted, namely:-

FORM VI-A

(See Rule 12-A)

Form of Warranty

Invoice No. Place

From : Dated

To :

Date of sale	Name & quality of article/ Brand Name, if any	Batch No. or Code No.	Quantity	Price

I/We hereby certify that food/foods mentioned in this invoice is/are warranted to be of the nature and quality which it/these purports/purport to be

(Signature of Manufacturer/Distributors/ Dealer)

Name and Addres of
Manufacturer/Packer
(in case of packed article)

License No............................
(Wherever applicable)"

(4) In Form VII, the followhing shall be deleted.
"2, Name of the Vendor".

(The Gazette of India No. 270, Part II Section 3-Sub-section (i) 1988, 4-5)

QUALITY CONTROL

173 Aspartame in USA approved

At present there are 1,241 products in the world (5000 in USA) with aspartame as the sweetening agent. Aspartame is marketed under the trade name NutraSweet (for aspartame manufactured by NutraSweet Co, Deerfield, Ill.). Last June, the FDA in USA approved the use of aspartame for use in food products in six more categories: The six categories are:

a) Ready-to-serve, non refrigerated pasteurized, aseptically packaged fruit juice, beverages. For products with pH above 4.5, aspartame may only be added subsequent to pasteurization.

b) Frozen desserts, both dairy and non dairy.

c) Refrigerated flavoured milk beverages.

d) Refrigerated ready-to-serve gelatin desserts.

e) Fruit (including grape) wine, beverages containing less than 7% alcohol.

f) Yogurt-type products where aspartame is added after pasteurization and culturing.

Consumer products in the newly approved above categories will be on the market by early 1989.
(*Chemical Weekly* 34(27), 1989, 81)

HYGIENE

174 High fat, calorie diet and colon cancer

A new study at the State University of New York (Buffalo), claims to be the first data to directly link the total amount of calories consumed and the risk of colon cancer. The researchers conducted detailed dietary interviews with 428 patients diagnosed with colon cancer and matched controls between 1975 and 1984.

An increased risk of colon cancer correspondend to increases in the amount of both total fat and total calories. In those who consumed the most fat and/or calories, risk of colon cancer was 4-times higher in men and 2.5 times higher in women, compared with their low fat and/or low-calorie diet cahorts.

Consumption of dietary fibre appeared to reduce the risk of colon cancer for women only, with the most significant reduction from high intake of tomatoes, peppers, carrots, onions and celery.
(*Chemical Weekly* 34(35), 1989, 83)

175 The catch in cholesterol-free milk

Researchers in the US claim to have perfected a technique that removes 90 per cent of the cholesterol from milk. As per Syed Rizvi s process carbon dioxide is forced through the milk at very high pressures and temperatures (about 2750 kilpascals and 40 C), so that the cholesterol dissolves into the carbon dioxide. At these temperatures and pressures, the carbon dioxide passes through a physical phase between its gas and liquid state and becomes a "supercritical fluid". Cholesterol is highly soluble in carbon dioxide in this superceitical form.

Other teams have tried to extract cholesterol from milk in the same way, but Rizvi says that they have not been as successful.

Once the carbon dioxide has picked up the cholesterol, along with a small amount of the triglycerides, the supercritical carbon dioxide passes to a second chamber. Here, the temperature and pressure altered and the carbon dioxide gives up its cholesterol. The carbon dioxide then flows into a third vessel where the pressure is reduced, the carbon dioxide becomes a gas dissipates and leaves behind the triglycerides that it has carried from the milk.

The researchers collect the fats from the first and third vessels which they can add to skimmed milk to produce cholesterol-free milk with, say, 2 per cent fat content - the equivalent of semi-skimmed milk. Whole milk contains about 3.3 per cent fat and 0.014 per cent cholesterol. Skimmed milk contains roughly 0.1 per cent fat and 0.002 per cent cholesterol.

Rizvi says that, although he has concentrated on taking the cholesterol out of the milk, his process could produce milk with a lower ratio of saturated to unsaturated fat than ordinary whole milk.

He would do this by taking advantage of the fact that less volatile saturated fats vaporise more slowly than unsaturated fats

Rizvi could add fractions of unsaturated fats to skimmed milk to produce milk with little cholesterol and a more healthy ratio of saturated to unsaturated fat.
(New Scientist 22 April 1989, 38)

TRANSFER OF TECHNOLOGY AND NEW INDUSTRIES

176 Wimco to diversify food processing

Wimco is planning to diversify into farm-forestry and food processing in a big way, following the recent takeover of its parent company Swedish Match by another Swedish giant, Stora, the biggest forest industry enterprise in Europe.

The company is gearing up its Food Processing Division as it has identified huge local as well as export markets. A variety of fruit-based concentrates have also been developed. It has plans to make natural fruit drinks as well. In packaging it plans to make hi-tech packaging products with the help of the Swedish company.
(Industrial Products Finder 17(5), 1989, 115)

177 Dharnendra Group to set up icecream unit

Dharnendra Group of industries, engaged in the manufacture of readymade garments and furnishing for the past 20 years, is promoting Dharnendra Icecream Ltd. The modern plant with an annual capacity of 28 lakh litres of icecream is coming up at the GIDC Estate, Gandhinagar, at a cost of Rs. 1.75 crore. Sophisticated automatic plant and machineries are being imported from Denmark and Italy. The company is introducing computerised control system for the first time in the country to monitor product quality

The plant is expected to start commercial production in March 1989. The company is likely to start a deep freezer project at a cost of Rs. 1.25 crore. The company has planned to establish 1,500 outlets including well designed icecream parlours during the first year of commercial production.
(Industrial Products Finder 17(5), 1989, 87)

178 Beer production

Kishore Chhabria of Shaw Wallace seems hell-bent on making a big splash in the country's beer market. According to Calcutta-based sources, Shaw Wallace plans to set up as many as three new plants to make beer. One brewery will come up in Maharashtra, another in Himachal Pradesh and the third in West Bengal. Together, these units will add 600,000 litres of beer to Shaw Wallace's capacity which should see the company run headlong into confrontation with market leader UB. The investment outlay for these plants will be over Rs. 36 crore as they are likely to incorporate the latest technology in beer production.
(The Economic Times 9 April 1989, 3)

179 Pineapple juice unit coming up in Assam

Modern Food Industries (India) Ltd is setting up a pineapple juice concentrate plant in Silchar, Assam. This is scheduled to be completed by 1989-90. The company is planning additional breadline and the facility in the Delhi bakery unit was commissioned in November 1988 The expansion of the fruit juice bottling plant in Delhi was also completed and the expanded capacity was inaugurated in 1988.
(Industrial Products Finder 17(6), 1989, 113)

180 New drink from NERAMAC

North Eastern Regional Agricultural Marketing Corporation Ltd.,(NERAMAC). has launched a pineapple fruit drink, 'PINEAP' in tetra brik asceptic consumer packs

NERAMAC, a government of India enterprise, comes under the administrative control of ministry of food processing industries. Its marketing operations are directed towards the upliftment of the fruit and vegetable growers of the north-eastern region facing major problem of transport and marketing of their horticultural produce.

NERAMAC's Rs 4 crore fruit juice concentration plant is set up at Nalkata, Tripura. The first plant of its kind in the country it is capable of processing 2 000 pineapples per hour. Equipped with the most modern machinery imported from Italy, Sweden and the USA, the plant can process fruit in the most hygienic way

(Commerce 5-11 April 1989, 48)

181 Vegetable oil refinery in Assam

Assam State Co-operative Marketing and Consumer Federation Ltd., (Statefed), the apex co-operative organisation in trade in the state is setting up a vegetable oil refinery here for refining the imported vegetable raw oil for the entire north eastern region

The capacity of the refinery will be 50 tonnes per day and the approved project cost is Rs. 2 68 crores to be funded by the National Co-operative Development Corporation (NCDC)

The Statefed is implementing a few Centrally-sponsored schemes like the expansion of the existing vanaspati plant from its present capacity of [illegible]2.5 tpd to 125 tpd at a cost of Rs [illegible]-24 crores (95 per cent of which will be loan from the World Bank through NCDC

(The Economic Times 26 April 1989, 10)

182 Milkfed plans to set up UHF plant

The Punjab State Co-operative Milk Producers Ltd (Milkfed) has planned to set up a Rs. 3-crore ultra high fat (UHF) plant near Chandigarh this year to supply milk in tetra packs. In the initial stages, Milkfed is likely to launch tetra packs at Leh, Jammun and Kashmir and later in Karnataka. These packs will have a shelf-life of six months.

Milkfed has recently lauched four of its milk products, Verka-skimmed milk powder, whole milk powder pure ghee and processed cheese, in Karnataka. Milkfed's turnover, which stands at Rs. 80 crore, is expected to cross Rs. 100 crore by 1988-89.

(*Industrial Products Finder* 17(6), 1989, 123)

183 First vanaspati unit in Manipur

Oswal Wollen Mills Groups has joined hands with the Manipur Government for setting up the State's first vanaspati unit in Imphal. Manipur Vanaspati and Allied Industries Ltd., the Rs. 12-crore project to produce 125 tonnes per day (TPD) is expected to begin production by mid-1989. While the Manipur State Industrial Development Corporation will contribute 26 per cent, the Oswals will contribute 25 per cent of the equity.

The group is also going ahead with its plans to set up a joint sector vanaspati unit in collaboration with the UP Government.

(*Chemical Products Finder* 7(10), 1989, 115)

184 Glindia, PICUP Joint Venture

Vegepro Foods and Feeds Ltd., a joint sector project promoted by Glindia Ltd. and the Pradeshiya Industrial and Investment Corporation of UP Ltd. (PICUP), has set up a project at Orai, Jalan district, UP, for the manufacture of texturised vegetable proteins, edible soya flour, soya oil, soya meal to be followed by other sophisticated downstream products. The plant will have a capacity to process 90,000 tonnes per annum of soyabean.

The company has made arrangements for the latest flash desolventising technology for the manufacture of edible soya flour from EMI of the US. The refining plant is set up with Alfa Laval technology. The compay will provide high quality low-cost edible soya proteins and refined/deodorized soya oil for manufacturing a wide variety of high protein products for special target groups. Edible soya flours will be used as additives to wheat, maize and other cereals to increase protein efficiency.

These texturised products can be used as vegetarian meat analogues and instant vegetarian meals based on texturised soya products.

(Chemical ProductsFinder 7(10), 1989, 118)

185 Grape Processing Unit At Miraj

A Rs. 1.25-crore co-operative processing factory for converting grapes into raisins has been recently inaugurated in the premises of the Maharashtra Industrial Development Corporation at Miraj. The factory will process 20 tonnes of grapes per day.

(Chemical ProductsFinder 7(10), 1989, 123)

186 Amrit Protein Foods plant opened

Amrit Protein Foods Ltd., a company promoted by Amrit Banaspati Company, was inaugurated by the Minister for Food Processing, Mr. Jagdish Tyler, on Thursday.

Set up at Ghaziabad with a total outlay of Rs. 15 crores, the unit will produce soya milk and soya milk beverages in various flavours.

(Financial Express 19 May 1989, 6)

SPECIAL ARTICLE

DIETARY FIBRE IN INDIAN DIETS AND ITS NUTRITIONAL SIGNIFICANCE

B.S. Narasinga Rao

Dietary fibre is defined as plant cell components, present as part of diet, and resistant to digestive secretions of the gastrointestinal tract. Thus they are considered as "unavailable carbohydrates". Dietary fibre, however, is not a single entity, but consists of a wide range of complex polysaccharides. Dietary fibre in any food is a mixture of cellulose, lignin and non-cellulosic polysaccharides namely hemicellulose, plant gums, pectins, and mucin(Table 1). Dietary fibre is usually determined by fractionation procedures and the one proposed by Southgate is now widely used. The estimate of amount of dietary fibre in a food will depend upon the analytical method used for the estimation and the values so obtained need not necessarily be considered always precise. Dietary fibre estimation is still considered to be only quantitative.

"Crude fibre", which is reported in food composition tables now in general use, represents material left after treating food with hot acid and hot alkali and perhaps corresponds to a part of cellulose and lignin component of dietary fibre and does not include all other components of dietary fibre as defined earlier. The total dietary fibre content in foods as determined by modern methods is five to 20 times higher than the earlier reported values for the "crude fibre" content. Chemically dietary fibre is polysaccharide whose basic units are neutral sugars such as glucose, mannose, xylose, arabinose and their derivatives or galacturonic acid. Lignin is a complex material composed of phenolic derivatives (Table 1). Plant foods contain different proportions of these dietary fibre components which are now determined by the standard fractionation procedure proposed by Southgate. Limited data derived from analysis of Indian foods for dietary fibre employing Southgate's method have been reported (Table 2).

Dietary fibre component of common foods consumed in India vary from 2 to 25 g per 100 g. Cereals and pulses are rich sources of dietary fibre, and contain 8.20 g fibre per 100 g. Dietary fibre in composite diets is contributed by cereals, pulses, vegetables, fruits, nuts and oilseeds. In Indian diets, however, cereals and millets are more important sources of dietary fibre than vegetables and fruits, etc. Dietary fibre content of some diets, consumed in India based on different cereals is given in Table 3. Nearly 90 percent of dietary fibre in Indian diets is contributed by cereals, not only due to fairly high fibre content of unrefined cereals/millets, but also due to a high consumption of the unrefined cereals/millets in Indian diets. An Indian adult may thus consume 50-120 g dietary fibre/day through his habitual diet depending upon the type and the quantity of cereals/millets consumed (Tables 3 and 4). Diets of pre-school children may contain 20-25 g of dietary fibre/day (Table 5). The desirable level of daily dietary fibre intake by an adult is generally believed to be around 40 g. It would appear that on this basis, dietary fibre content of habitual Indian diets which ranges 55-120 g is on the higher side. Hence a reappraisal of the beneficial and undesirable effects of such high levels of dietary fibre in Indian diets become necessary.

TABLE 1

Components of Dietary Fibre

Major class	Property	Chemical Steriods
Cellulose	Water insoluble	Linear 1-4-3-glycan
Non-cellulose polysaccharides		
Pectin	Water soluble	Galacturonic acid. neutral sugars
Hemicellulose	Water soluble	Xylose, arabinose, galactose, mannose
Gums	Water soluble	Xylose, arabinose, rhamnose
Mucilages	Water soluble	Galactose, galalumeric acid, rhamnose
Lignin	Water insoluble	Polymer of hydroxy phenyl propone derivatives

TABLE 2
Dietary Fibre Content of Some Common Indian Foods

Food stuff	Energy[a] kcal	Crude fibre[a] gm	Dietary fibre[b] gm	Food stuff	Energy[a] kcal	Crude fibre[a] gm	Dietary fibre[b] gm
Cereals & millets:				Roots & tubers:			
Rice	345	0.2	7.6	Sweet Potato	120	0.8	7.3
Wheat	346	1.2	17.2	Potato	97	0.4	4.0
Sorghum	349	1.6	14.3	Yam	79	0.8	5.3
Bajra	361	1.2	20.3	Fruits:			
Ragi	328	3.6	18.6	Banana	116	0.4	2.5
Pulses & legumes:				Mango	74	0.7	2.3
Gereengram whole	334	4.1	15.2	Vegetables:			
Greengram dhal	348	0.8	13.5	Amaranth	45	1.0	3.4
Blackgram dhal	347	0.9	14.3	Palak	26	0.6	5.0
Redgram dhal	335	1.5	14.1	Brinjal	24	1.3	2.0
Bengalgram whole	360	3.9	26.6	Ridge gourd	17	0.5	5.7
Bengalgram dhal	372	1.2	13.6	Snake gourd	18	0.8	1.8
Nuts & oilseeds:							
Groundnut	567	3.1	6.1	Bottle gourd	12	0.6	2.8
Coconut dry	662	6.6	8.9	Yellow Pumpkin	23	0.7	0.5

Values are for 100 g food
a: taken from Nutritive Value of Indian Foods; b: from Kamath and Belvadi J.Sc. Food Agr. 31, 191 (1980)

TABLE 3
Dietary Fibre Content of Average Rural Indian Diet Based on Different Cereals

Cereal/Millet	Energy (kcal/d)	Crude fibre (g/d)	Dietary fibre (g/d)	Overestimation of[a] energy intake (%)
Rice	2427	3.3	52.0	8.0
Wheat	2433	8.8	107.0	16.2
Sorghum	2449	11.0	89.2	12.8
Bajra	2516	8.8	122.3	18.0
Ragi	2333	22.0	113.5	15.7

Daily intake of cereal: 552 g

a: By considering dietary fibre as a part of carbohydrate and computed as follows:

$$\frac{\text{Dietary fibre - crude fibre} \times 4 \times 100}{\text{Energy intake}}$$

Beneficial Effects of Dietary Fibre

Health benefits of dietary fibre are being increasingly recognised. Some of the diseases like colon cancer, cardiovascular diseases prevalent in developed countries are attributed to low fibre content of their diets. Dietary fibre has the tendency to absorb water and to act as "bulking agent". It facilitates faster transit of foods in the gastrointestinal tract and reduces the retention time of faeces in the colon. Some of the well established functions of fibre are indicated in Table 6. Dietary fibre could prevent colon cancer and other bowel disorders by decreasing retention time of faeces in the colon. It could bind bile salts and help in increasing the loss of cholesterol and act as a hypocholesterolemic agent and therefore useful in dietary management of cardiovascular diseases. Similarly, some of the dietary components, particularly gums, tend to slow down glucose absorption and are useful in management of certain types of diabetes. Dietary fibre may bind xenobiotics and toxins and reduce toxicity of food borne toxins. Because of these favourable functions of fibre in the diet, high fibre diet is considered to be beneficial for maintaining good health. Some of the cereal based Indian diets contain 80-120 g dietary fibre, mostly (90 percent) derived from cereals. The relative effectiveness of such high fibre diets (wherein fibre is mostly derived from cereals) in conferring the above health benefits on Indians in comparison with diets with high fibre content wherein fibre is derived from fruits and vegetables, needs assessment.

TABLE 4
Dietary Fibre Content of Regional Diets

Regional diets	Energy (kcal/d)	Crude fibre (g/d)	Dietary fibre (g/d)	Overestimation of energy intake (%)
Andhra Pradesh				
Very low income	2558	4.4	57.7	8.3
Low income	2592	4.7	53.0	7.5
West Bengal:				
Very low income	2621	4.5	56.4	7.9
Low income	2649	4.3	56.9	7.9
Uttar Pradesh:				
Very low income	2650	7.2	48.0	6.2
Low income	2619	6.6	67.4	9.3
Maharashtra:				
Very low income	2595	9.1	81.6	11.2
Low income	2554	7.5	68.6	9.5

a: By considering dietary fibre as a part of carbohydrate by difference and computed as given in Table 3.

b: Actually determined in cooked diet (Nageswara Rao and Narasinga Rao, Nutr. Met. 24, 244, 1980)

TABLE 5

Dietary Fibre Content of Diets of Pre-School Children of Different Income Groups

Socio-economic Group	Energy (kcal/d) (g/d)	Crude fibre (g/d)	Dietary fibre
		Rice	
High income	1011	0.9	12.0
Middle income	792	1.0	13.0
Low income	701	0.9	12.7
Rural income	610	0.8	12.2
		Wheat	
High income	1012	1.9	21.6
Middle income	793	2.1	23.6
Low income	703	2.3	26.0
Rural income	612	2.1	24.5
		Sorghum	
High income	1015	2.3	18.7
Middle income	776	3.2	20.4
Low income	707	2.8	22.0
Rural income	615	2.6	20.8
		Ragi	
High income	994	4.3	23.0
Middle income	774	5.4	25.1
Low income	678	5.6	28.0
Rural income	589	5.1	26.3

Possible Undesirable Effects

Nutrient bioavailability: Not withstanding the health benefits of dietary fibre discussed above, fears have been expressed that high fibre diet may reduce nutrient bioavailability. This may become critical in diets high in fibre, but poor in nutrients. Diets of poor Indians in rural areas are rather high in fibre (80-120 g/day) but marginal or even deficient in several nutrients. Although the effects of dietary fibre on various nutrients like "available" carbohydrates, fats, proteins and minerals have been studied, evidence of significant deleterious effect has been seen only in case of divalent metals like Ca, Mg. Zn and iron.

The reported effects of dietary fibre on the bioavailability of proteins and fats are too small to be nutritionally significant. However, in case of carbohydrates, although the net availability is not affected, dietary fibre particularly the soluble gel forms (pectins and gums) have been shown to modulate absorption of available dietary carbohydrates. Although the mechanism of this effect is unclear at present, various mechanisms like increased viscosity, delayed stomach emptying time and osmotic effect of diets containing soluble fibre have been proposed. The effect of dietary fibre in delaying carbohydrate absorption is currently exploited in the dietary management of diabetes for preventing excessive rise in blood glucose.

TABLE 6

Some Properties of Dietary Fibre and Their Health Consequences

Function	Health Consequences
Water absorbing and bulking property	Energy diluent to formulate low calorie diets
Increased transit time of food in the gut	Reduced risk of inflammatory bowel disease
Bile acid and steroid binding	Hypocholesterolemic agent and reducing the risk of cardiovascular diseases
Retardation of carbohydrate absorption and impaired glucose tolerance	Management of certain type of diabetes
Binding of toxins	As a detoxifying agent
Binding of divalent cations	Reduced bioavailability of Ca, Mg, Zn. Fe.

The effect of fibre on divalent metal absorption is considered nutritionally significant. These polysaccharides with reactive groups like hydroxyl and carboxyl can bind divalent cations. Besides, phytates, oxalates, tannins which are closely associated with the fibre can also bind minerals and reduce their bioavailability. This effect on mineral bioavailability assumes importance in high fibre diets consumed in India. The effect on mineral bioavailability depends on the fibre type and the minerals; all fibre types may not affect all minerals to the same extent. Minerals, so affected are Ca, Zn, Fe, Mg. Reduced bioavailability of minerals particularly iron observed in cereal-based Indian diets may be partly due to high fibre and partly due to high phytate and tannins present in such diets. The relative contribution of fibre, phytate and tannins in reducing bioavailability of minerals from cereals based Indian diets needs to be assessed. As far as vitamins are concerned, nothing can be predicted about the behaviour of fibre on vitamin bioavailability from the currently available data. However, as with other macro-nutrients, available information indicates that the effect of fibre, on vitamin availability, if any, need not cause any concern. On the other hand, fibre due to its undergoing colonic microbial fermentation may contribute some vitamins to the host. There is, however, a need to study systematically to what extent high fibre present in Indian diets contributes to low absorption of iron, calcium, etc. with well-designed studies in humans. It is also to be seen whether dietary fibre at the level present does modify vitamin availability and significantly affect already existing deficiencies of vitamins among our population.

Energy availability from high fibre diets: There has been some concern that high levels of dietary fibre may compromise bioavailability of energy from such diets. This concern stems from the consideration that dietary fibre, by definition, is "indigestible" and hence its energy content may not be utilisable by the body. Current estimates of energy content of foods assumes that only the "crude fibre" is indigestible and, in the present conventional methods of food analysis, the rest of the fibre is included as a part of dietary carbohydrate which is computed by difference, i.e. by deducting the protein, fat, moisture, crude fibre and ash content per 100 g from 100. By this procedure, dietary fibre excluding the crude fibre is assumed to yield 4 kcal/g. We know now that dietary fibre content of food is several-fold higher than "crude fibre" and the energy from the rest of the dietary fibre apart from crude fibre may not be fully available. Thus current estimates of energy content of foods and diets could be overestimates and there is, therefore, a need to reevaluate the energy content of foods after taking into account their total (and not just "crude fibre") dietary fibre content.

High fibre diet can compromise availability of energy from diets in two ways: dietary fibre has the property of swelling on water absorption and increasing the bulk of the diet and decreasing its energy density.

With a given capacity of stomach, the amount of food that can be eaten, and the energy intake therefrom will be correspondingly low on a bulky high fibre low-calorie-density diet. This is particularly so with young children who need relatively more calories per kg body wt (100 kcal/kg) than adults (40 kcal/kg). Young children will have to eat two or three times as much of the bulky diet as an adult per kg body weight to meet their calorie needs. The principle of diluting energy density of diet with inclusion of fibre is in fact used to formulate low calorie diets for the control of obesity.

Another way calorie intake on a high fibre diet may be low is due to unavailability of energy from dietary fibre. This may be significant if dietary fibre content in the range of 80-120 g/day as in habitual Indian diets, based on different cereals and millets. As discussed above, most of the dietary fibre is taken as available carbohydrate in computing energy content of foods given in our food composition table. On this basis, current computation of energy intake on high fibre diet would be an overestimate. Dietary fibre however, by definition is unavailable carbohydrate not subject to enzyme hydrolysis and absorption in the small intestine. Then we would have overestimated energy intake on cereal based diets by eight and 12 percent (i.e. 200-300 kcal/day/adult), If it were really so, it would have far reaching consequences on present estimates of energy adequacy in our population and also other derived parameters based on energy intakes, namely proportion of population below poverty line, etc. Let us examine this issue in the light of available data.

Microbial Breakdown of Dietary Fibre

Although dietary fibre is conceptually indigestible and unavailable, its possible breakdown by gastrointestinal microflora has been investigated for more than half a century. It is widely known that plant cell-wall materials which constitute dietary fibre are broken down by symbiotic microorganisms in rumen from which they derive their energy. There is also considerable evidence to indicate that such complex carbohydrates, as cellulose, hemicellulose and non-cellulosic polysaccharides are broken down by microorganisms of the intestinal flora, particularly in the colon of non-ruminants like rat, rabbit and man. This is based on severa studies including in vitro studies, balance studies, where faecal loss of calories and fibre components are measured in faeces of rat, man, rabbit, etc. Balance studies with rice and sorghum-based diets in rats by Kamath and Belavadi has indicated that only 20 and 37 percent of fibre from these two diets are excreted in faeces respectively. It is seen that 70-80 percent of the fibre is broken down. It is known that a substantial part of dietary fibre is broken down by the microflora of the lower gut releasing lower fatty acids like acetic propionic, butyric acids, CO_2, hydrogen and methane. These fatty acids can be absorbed and utilised as energy sources. The latter has also been demonstrated by feeding fibre to rats on energy restricted diets. Bacteria recovered from colon, faeces of both men and animals has been shown to possess hydrolysing activity against a variety of polysaccharides. The dietary fibre components thus broken down include pectins, cellulose, hemicellulose, some gums, non-cellulosic glucans, mucopolysaccharides and mucin glycoproteins.

The extent of digestibility of dietary fibre would vary from one fibre component to the other and would also depend on the profile of the gut microflora in the individual. The extent of the digestibility of dietary fibre also would vary from one food source to the other, apparently because of the chemical composition of the fibre type.* Fibre from vegetables and fruits are reported to be digestible to the extent of 50 to 80 percent. From all available information it would appear that at least 50 percent of the dietary fibre present in diets may be broken down by colonic microorganisms releasing acetic, propionic and butyric acids which can be absorbed and used as sources of energy. In the light of available data, it would be rather inadvisable to conclude that the whole of dietary fibre in Indian diets in unavailable. There is an urgent need to study systematically the colonic breakdown of dietary fibre present in Indian diets which are derived mostly (90 percent) from cereals and millets. Such studies must be carried out not only in animals, but in subjects habituated to these diets since it is reported that individuals accustomed to eating high fibre diets are more efficient in breaking down and utilising these fibre components than those who are not used to such diets. For the time being the question may be kept open and for practical purposes, about 50 percent of these fibres may be assumed to be available for providing energy. If this were so the actual overestimation in present computations of energy intake by our population will be in the range of only four to six i.e. 120-150 kcal/day/C.U.

There is a clear need for a reappraisal of energy intakes of our population subsisting on high fibre cereal/millet diets based on accurate information on the availability of energy from the dietary fibre present in these diets.

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Food Science and Technology Information Service
C.F.T.R.I., Mysore 570 013, India.

FOOD DIGEST

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RAW MATERIALS

187 Edible oil from flax seed

Biotechnica (Canada) and Australian CSIRO are collaborating to develop a new edible vegetable oil from flax seed. Under a proposed joint venture the researchers from the above two countries will develop varieties of flax which produce oil similar to sunflower or corn oil.

By the mid 1990s edible oil flax may be grown on several million acres as an alternative crop.
(Chemical Weekly 34(40), 1989, 82)

188 Organic vegetables

An astounding 84% of American consumers would buy organically-grown food if it cost the same as that produced with synthetic fertilizers and pesticides, and 49% would buy it even if it cost more.

Organic food isn't just for alternative lifestyle hippies and little old ladies in tennis shoes any more. It isn't even grown just at ramshackle communes, but on large farms where (for example) huge vacuum-cleaners suck up insects as an alternative to spraying them.

Sunkist Growers and Dole Foods are among the major players to have gotten into organic farming in the last few years. Sales of organic products doubled from $ 500 million to $ 1 billion between 1983 and 1988, estimates California Certified Organic Farmers, a trade group. A Maryland firm, Organic Farms, Inc., was the country's top distributor of organic products last year, with sales of $ 22 million.

Organic produce usually costs 15-30% more than traditionally grown product, but some attribute this to start-up and distribution costs that could be considerably reduced by economies of scale. Less than one percent of all produce is now grown organically, but that could increase to eight or nine percent in the next few years because of increased consumer demand. Some 20 major supermarket chains began stocking organic products in the last six months, according to Organic Farms, and that was before the March scares about alar on apples and cyanide in Chilean grapes.
(Quick Frozen Foods International 30(4), 1989, 36)

STORAGE

189 Fruit stays fresh longer

Fruit and vegetables can stay fresh longer in a range of bags made from natural stone powder compounded with low density pe film, claims Takii Shubyo Co. Ltd.

Marketed under the name TS-film Nagomochikun - Mr Longer Lasting - the bags absorb ethylene gases generated by vegetable matter which accelerates the deterioration process, says the company .

For details write to: Inokuma Higashihairu, Umekoji, Simogyo-ku, Kyoto.
(Packaging News May 1989, 30)

190 Tomato treatment for better storage

Biologists at New York's Cornell University have developed a natural, inexpensive treatment which will keep ripe, tasty tomatoes on the supermarket shelf twice as long as present varieties. The treatment uses biochemical clues from an obscure Brazilian tomato called Alcobaca. If the treatment is used commercially, supermarkets may be able to stock ripe tomatoes for 10 to 12 days. Today, unsold tomatoes are thrown away after 4 to 5 days.

To slow the ripening process of the fruit, the American researchers use polyamines, which are a natural part of a tomato's chemical make up. They add 1 milligram of the polyamine 1,4 butanediamine to a tomato that has been picked after it begins to ripen on the vine.

Peter Davies, professor of plant physiology, and his colleagues realised the importance of 1,4 butanediamine because they found that the Alcobaca tomato had nearly three times as much of the chemical as standard tomatoes. The tomato is also unusual in that it stays ripe and firm longer than any other tomato.

The scientists infuse tomatoes of the Rutger variety with the polyamine using a method called vacuum infiltration. This involves forcing the air out of the fruit while it is in an airtight container with the polyamine in solution. When the vacuum is released, the polyamine is drawn into the tomato through the stem or stem scar.

The Alcobaca tomato has yet another characteristic which makes it exceptional. It has to ripen fully on the vine because it will not ripen if it is picked green. This is important because tomatoes taste best when they are allowed to ripen on the vine. However, most tomatoes in the supermarket have to be picked while still green because ripe tomatoes are perishable.

The new treatment promises to put tasty tomatoes back in the supermarkets. Commercial pressures have made today's tomatoes pulpy, juiceless and tasteless.
(New Scientist No 1670, 24 June 1989, 43)

191 Proposal for the development of fish storage facilities

Addressing the third meeting of the Consultative Committee of the members of the Parliament attached to his Ministry, Shri Jagdish Tytler, Hon'ble Minister of State for Food Processing Industries, disclosed that the Government is considering a proposal to set up a "cold chain" for storing fish at the main production and consumption centres in the country as a part of the strategy to develop fishing industry in a comprehensive manner. Under the scheme, the cold storage facilities so created would be linked by refrigerated and insulated transport.
(Seafood Export Journal 21(1), 1981, 32)

192 Milk coating could push frozen foods into the cold

The dull fare of frozen pizza, chips and other convenience foods may soon become obsolete, following the development of a new technique to keep sliced fruit and vegetables fresh and tasty for several days. Instead of filling up shopping trolleys with their usual frozen assortment, people may soon be able to buy fresh food that has already been washed, sliced and pitted.

Attila Pavlath, from the US Department of Agriculture Research Service in Albany, California, has found a way to keep sliced fruit and vegetables fresh for up to three days by covering them with an edible coating based on milk.

Although farmers use coatings to increase the lifetime of their produce, until now no one has found a way of preserving fruit and vegetables that have been cut or peeled. The problem researchers face is to develop a coating that will stick onto a moist surface and prevent oxygen passing in and water passing out.

Most fruit and vegetables give off carbon dioxide after they have been picked. Unless the coating enables the carbon dioxide to pass through it, the taste of the food will change. The coating also has to be edible and - perhaps the most difficult condition to meet acceptable to the US Food and Drug Administration (FDA).

Pavlath took milk as a starting point because the proteins in it make a very good film. Protein films form an inadequate barrier against water and oxygen, so Pavlath had to modify them by adding enzymes to the milk.

These enzymes "tie" the proteins together. Pavlath used the technique to weave proteins together, so forming a mesh fine enough to reduce the amount of oxygen and water molecules crossing the barrier.

The films could also be used to modify produce and, according to Pavleth, add "exciting new flavours or colourings to standard fare".

One possibility, he suggests, is to "jazz up" sliced pears by protecting them with a protein coating flavoured with natural red cherries. The coatings could also be used to keep fillings in pies and pizzas from soaking the crust, says Pavlath.

Although the barrier keeps cut fruit and vegetables fresh for several days, food companies are unlikely to use Pavlath's coating unless it can preserve food for several weeks, because of the amount of time it takes to distribute food to supermarkets.

Pavlath believes that he will be able to make his coating more effective by making the molecular mesh even finer. The problem, however, is not trivial, because if the mesh is too fine then the film will become rigid and prone to crack, allowing the food to decay.

Pavlath is trying to find a solution by adding various compounds to his milk coating, although, because the coating has to be edible, his choice is restricted.

"Trying to overcome the technical problems and satisfying the FDA is like dancing on a tightrope," says Pavlath. "I am sure it can be done, but it is a matter of time, perhaps two years". Ballab Ghosh.
(New Scientist No. 1669, 17 June 1989, 44)

193 Pumps to deliver pesticides

A simple fumigation technique could rid grain silos of insects much more effectively than conventional methods. Entomologists unveiled the technique, called Siroflo, at Moree in New South Wales, Australia, this week.

Siroflo, which was developed by researchers at Australia's Commonwealth Scientific and Industrial Research Organisation (CSIRO) involves pumping low concentrations of phosphine gas mixed with either nitrogen or carbon dioxide through the grain at a constant rate.

The technique promises to be a boon to farmers all over the world because insects in many countries are proving resistant to phosphine as the pesticide is currently applied. Bangladesh, Pakistan and India, in particular, have been reporting that insects are becoming resistant to phosphine.

This method normally eliminates the pests in two stages of their development, the larval and adult stages, but not when they are eggs and pupae. The surviving eggs and pupae are difficult to detect. Unless high concentrations of phosphine are used for long periods, the insects could breed again.
(New Scientist No. 1670, 24 June 1989, 38)

194 Food-biocide for increased shelf-life

Raw fruits, vegetables, fish, sea-foods, meat, poultry, etc are mostly contaminated with pathogenic micro-organisms which not only make them unhygienic for human consumption, but also limits their shelf-life because they become unpalatable and foul smelling after certain time on storage, due to the deterioration in their natural taste and flavour.

An extremely powerful Biocide, AQUARINE liquid, destroy these micro-organisms, including bacteria, viruses, moulds, fungus, algae, yeast, etc effectively and economically. Aquarine also reacts with the putrid organic waste matters and destroy the foul odours. It controls the growth of micro-organisms, which promotes fermentation and purification. Moreover, it also destroys the unwanted Blood-Urea from the sea-foods. The raw foods, when properly treated by Aquarine, therefore, remain in fresh and palatable for much longer period and have thus, longer shelf-life.

Aquarine is equally useful as effective disinfactant for sterilizing and deodorizing the plant, equipments, containers, drainage, floor, water, etc; in the frozen foods, fisheries, canning, dairy, flour and rice mills and soft drinks industries. It is also useful for keeping the housefly away.

For further information please contact: Surfochem Industries, 3, Nilkanth Sadan, Peru bagh, Aarey Road, Bombay - 400 063.

FOOD ADDITIVES

195 Sucanat - A new natural sugar from Swiss research

Sucanat is a sweet alternative to refined white sugar recently marketed by Pronatec Ltd. (Switzerland). It was developed by Dr. Max Henri Beguin. It is a natural product, since it is fully dehydrated, evaporated cane juice. Sucanat contains all the vitamins and trace minerals lost during refining of sugar cane.

Sucanat is made by pressing the cane, filtering the juice to remove cellulose fibres, concentrating the juice, then drying in a vacuum and granulating. The result is a final product, which is a 1:1 replacer for sugar with 2.5% mineral salts, vitamins and minerals such as potassium, calcium, iron, phosphate, magnesium, zinc, copper and chromium.

This natural sweetener is not a low calorie product. It has slightly fewer calories than the equivalent of white refined sugar. Over 60 food companies have shown active interest in this natural sugar.
(**Chemical Weekly 34(40), 1989, 81**)

196 Food dyes corrode copper

Recent findings by Indian scientists indicate that aqueous solutions of food dyes can cause corrosion of copper – a fact which must be borne in mind while preparing artificial food colours.

The amount of copper in food articles ranges from 20 parts per million (ppm) in beverages to 100 ppm in tomato juice. Although copper is considered to be quite resistant to attack by most food items, it may corrode in the presence of oxygen or an oxidising agent. In such cases, the product may pick up enough copper to affect the colour or taste and give rise to off-flavours.

The corrosion of electrolytic copper by various food dyes like ponceau 4R, tartrazine, amaranth, carmoisine, sunset yellow, fast red E, indigo carmine and crythrosine was studied. The effects of additives like mango essence and sorbitol, or preservatives like sodium benzoate and potassium metabisulphate, on copper corrosion was also studied.

Very dilute (less than or equal to 0.01 per cent) solutions of the colourants were only mildly corrosive. However, a definite change in colour was observed in solutions containing ponceau 4R, amaranth, carmoisine and fast red E, which turned orange from yellow. Sunset yellow also changed to deep orange. But indigo carmine and erythrosine did not show any colour change.

In all cases except indigo carmine and crythrosine, the extent of corrosion rose with increasing concentration of the colours. While carmoisine was the most corrosive of all colourants erythrosine was the least.

Acetic acid was found to be the most corrosive, followed by citric acid, lactic acid, malic acid and tartaric acid.

Another significant finding is that ponceau 4R, which itself is very corrosive, becomes less corrosive in the presence of additives, whereas erythrosine, which is the least corrosive of all colouring agents, becomes the most corrosive in the presence of additives.
(P.T.I. Science Service 8(9), 1989, 2)

PROCESSES

197 Saffron stigmas produced in vitro

Researchers at Ajinomoto Co (Tokyo, Japan) have succeeded in producing saffron stigmas in vitro, opening up the way for the mass production of the world's more expensive spice. The technique was drawn from biotechnology related studies performed by plant scientists at Ajinomoto.

Saffron's high price derives from the short supply of stigmas and the enormous number needed to make spice. More than 500,000 are necessary to obtain 1 kg. of saffron. Produced in Spain, Kashmir (India), Afganistan and a few other countries, the saffron blooms for two weeks annually during which it must be picked by hand and dried.
(Chemical Weekly 34(40), 1989, 81)

198 A genetically-engineered yeast to ferment cassava to alcohol

Cassava is chiefly starch, not easily digestable sugars, unlike sugarcane. It does not yield readily to the yeast that breakdown plant material and produce alcohol. Researchers at the University of Sao Paulo's Institute for Biomedical Sciences have developed a new yeast with the ability to ferment Cassava effectively.

The researchers added to a yeast strain, the genes for three extra enzymes. One gene - a mouse gene for a pancreatic enzyme that helps break down starch into sugars - was introduced using genetic engineering techniques. The researchers then crossed the resulting yeast strain with two others until they obtained a hybrid that produces almost all the enzymes needed to break down cassava efficiently. The research group is now trying to add the gene for one last enzyme. With that, the fermenting ability of the yeast should be high enough to make cassava derived ethanol marketable.
(Chemical Weekly 34(42), 1989, 77)

199 Fuel from fruit

A West German scientist claims to have found a renewable source of energy in the fruit of the calabash tree, known as vilaiti bel in Hindi, reports Environment News Digest. After eight years of research in Nicaragua and other countries, he says ethyl alcohol produced from the fruit could replace petroleum. The study shows that the alcohol produced from the fruit has an octane value of 106.
(Deccan Herald 6 August 1989, 8)

200 Quick ageing of liquor

Eminent Indian molecular technologist Dr.R.Rank has developed a new process to advance the maturing of alcohol instantaneously which imparts characteristics of 20 years aged alcohol in 20 minutes. The process called 'straining of cho molecules' has been developed for the first time in the world, reports UNIFIN.

The present process to mature potable alcohol is to keep it for specified years in oak wood casks or barrels.

Dr.Ranks' process eliminates the prolonged process of aging or maturing the barrel, by incorporating modifications in the alcohol molecules through intensive stressing and straining.

Dr.Rank has developed various new methods for alcohol fermentation, distillation and blending, which have been employed by leading distilleries and breweries in the country.
(The Economic Times 10 August 1989, 4)

201 Protecting cheese against listeria

A British biotechnology company has developed a method of protecting cheese from infection by listeria bacteria.

The technique uses listeriaphages - a parasitic organism which works by attaching itself to the outside wall of the bacteria injecting their genetic material which takes over the bacteria's own reproductive mechanism. Instead of young bacteria, new listeriaphages are reproduced. The bacterium dies and breaks open releasing hundreds of new listeriaphages to attack the listeria bacteria.

Once the cheeses are made they are particularly vulnerable to listeria infection if not stored correctly. However if listeriaphages are added during the cheese-making process, they will remain active for the life of the cheese and are capable of attacking the bacteria if they infect the cheese and start to multiply at any stage.
(Deccan Herald 24 August 1989, I)

202 Waste-fuelled copra dryer

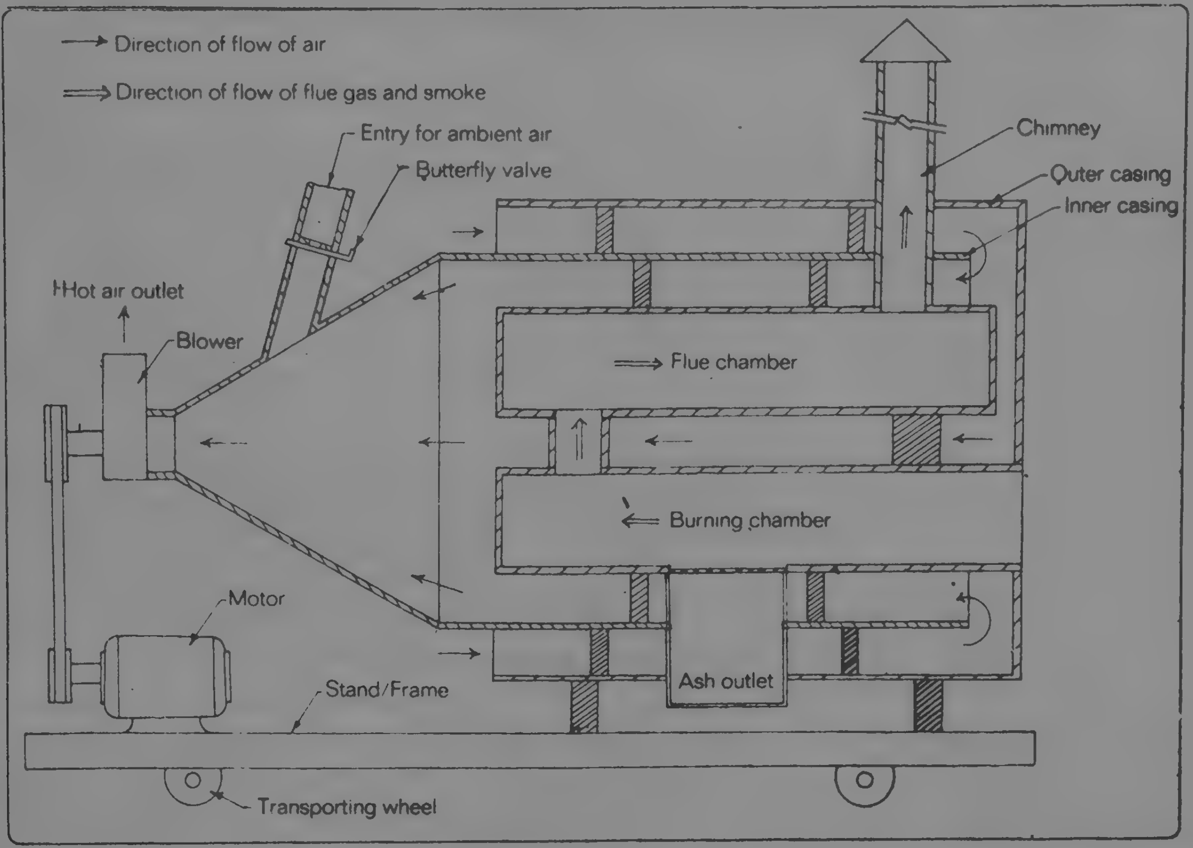
Sun and kiln drying are generally used for copra. Owing to the prolonged heating period in these practices, the coconut meal becomes susceptible to mould and fungal attack besides browning, which result in deterioration of the oil.

Mechanical drying is costlier than sun-drying. The cost of fuel is mainly responsible, especially when petroleum products or electrical energy is employed. To reduce costs, a batch bin dryer coupled with an agricultural waste-fuelled furnace was developed at the Department of Agricultural Processing, Tamil Nadu Agricultural University, Coimbatore.

The dryer consists of an agricultural waste-fuelled furnace, blower and a rectangular shaped holding bin. The unit is provided with rubber wheels for easy transportation.

The furnace is essentially a heat exchanger comprising mainly flue and burning chambers, encased in two concentric metallic casings as shown in the schematic diagram. This can generate heat by burning agricultural wastes, including coconut husk and shell. Any desired hot air temperature upto 90 C, can be obtained by suitably mixing the hot air with the ambient air, using adjustable butterfly valve provided.

The dryer was tested for drying of copra and found that a batch of 2,500 nuts at 50 per cent moisture content could be dried to seven percent moisture content within 20 hours at an optimum drying air temperature of 65 C. Conventional sun drying or kiln drying needs a drying period of seven to 10 days for the same reduction of moisture content.


→ Direction of flow of air
⇒ Direction of flow of flue gas and smoke
Entry for ambient air
Butterfly valve
Chimney
Outer casing
Inner casing
Hot air outlet
Blower
Flue chamber
Burning chamber
Motor
Stand/Frame
Ash outlet
Transporting wheel

The cost of dryer, including all accessories, is Rs.15,000. Drying a tonne of coconut in the mechanical dryer works out to Rs. 356 as compared to Rs.204 by sundrying. However, the quality of the copra dried by mechanical dryer was superior than that by sun drying. Drying can be done throughout the year irrespective of weather conditions using the mechanical dryer. This dryer can also be used for cereals, pulses, and other oilseeds.

For details contact: V.V. Sreenarayanan, College of Agricultural Engineering, Tamil Nadu Agricultural University, Coimbatore.
(The Hindu 12 July 1989, 24)

203 Improved processing of cuttle fish

Scientists at the Central Institute of Fisheries Technology (CIFT) have discovered that removing the liver from cuttle fish before processing reduces the cadmium content.

Cadmium is a highly toxic element found in the marine environment, which accumulates in the liver of cuttle fish in high concentrations.

The researchers observed that the cadmium level in cleaned squid tubes and cuttle fish fillets is 0.2 - 0.4 ppm well below the permitted level of 2 ppm.

In view of the stringent international standards governing the export of seafoods, CIFT has carried out an extensive study on the distribution of cadmium content in processed fishery products comprising crustaceans, molluses, marine fish and brackish water fish.

For more information, contact: Central Institute of Fisheries Technology, Matsyapuri P.O., Cochin 682 029.
(Economic and Commercial News 19(33), 1989, 13)

BY-PRODUCTS AND WASTE UTILIZATION

-Nil-

PROCESSED PRODUCTS

204 Many new uses of chitin and chitosan on the horizon

Chitin, a chemical derived from the shells of lobsters, crab, and crayfish is under intensive study in USA and Japan. This research has opened up several new uses for chitin.

In Japan chitin has been approved for use in cereals as a source of fibre and calcium. Japanese researchers have also found that in combination with other chemical chitin derivatives turn into gels that can be used in sonar equipment to send signals further.

Researchers in USA have found that chitin when sprayed on apples keeps them firm, and juicy for more than 8 months in cold storage and when applied to burns promotes healing and stops itching . When chitin is mixed with whey (a waste by-product of dairy industry), it makes a nutritious animal feed that produces leaney, meatier, tastier chickens. Most lactose contained whey (which contains 70% lactose), but chitin encourages the growth of bacteria in their digestive tract, which in turn produce enzymes enabling lactose to be metabolised.

Research is also on for developing uses for chitosan, another chitin derivative. Metabolic research on chitosan has shown that chitosan keeps the human body from absorbing fat and cholesterol.
(Chemical Weekly 34(44), 1989, 83)

205 Dry cashew fruit

A pilot plant for the production of upgraded dry fruit from cashew has been set up at Palghat by Prof. P.M. Edessery of the Pelatine Flower Food Research Station, Palghat. In the process, the ripened cashew apples are sliced and cured for one hour in hot

antastrin solution. Thereafter, it is dried in sun and later soaked in sugar solution. The dried fruit can be a superior substitute to other dried fruits.
(Chemical Weekly 34(40), 1989, 83-84)

EQUIPMENT AND MACHINERY

206 Seed extraction machine

An axial-flow vegetable seed extraction machine for extracting seeds from vegetable fruits such as tomato, brinjal, chillies, cucumber and watermelon has been developed by the agricultural scientists of the Punjab Agricultural University (PAU), Ludhiana.

According to experts, this machine is economical, faster, safe and hygienic for seed extraction from vegetable fruits in comparison to manual practices. Two firms in Punjab are manufacturing it.

The machine works on the principle of 'wet seed extraction' and uses freshly-harvested ripe vegetable fruits. It comprises a frame feeding chute, primary chopping chamber, crushing chamber and a centrifugal pump. Vegetable fruits are cut into small pieces with blades in the primary chamber and crushed finely by means of blades again in the crushing chamber.

Conveying rakes are provided in two rows on the shaft which move the pulp and waste material along the shaft length to eject the waste. Three pipes one on either side and one on the top cover of the machine, spray water under pressure from a small centrifugal pump. The sprayed water washes out the seeds and a fraction of the finely crushed fruit material which passes through the openings of the concave screen provided at the crushing chamber and is ejected through the speed outlet.

The concave screen can be easily removed and refixed to suit seed sizes of different vegetables, with small (5 mm), medium (10 mm) and large (12.5 mm) openings. The machine is operated with a two horsepower (HP) electric motor. Three persons are required for its working, two for feeding vegetable fruits and one for removing the pulp from the screen placed below the seed outlet on a tub.

The water, containing finely-crushed seed material, is collected in a trough. Seeds are separated and settle at the bottom of the trough. Fresh water is added two or three times to clean the seed and the water is removed by decantation. The seeds thus obtained are sun dried.

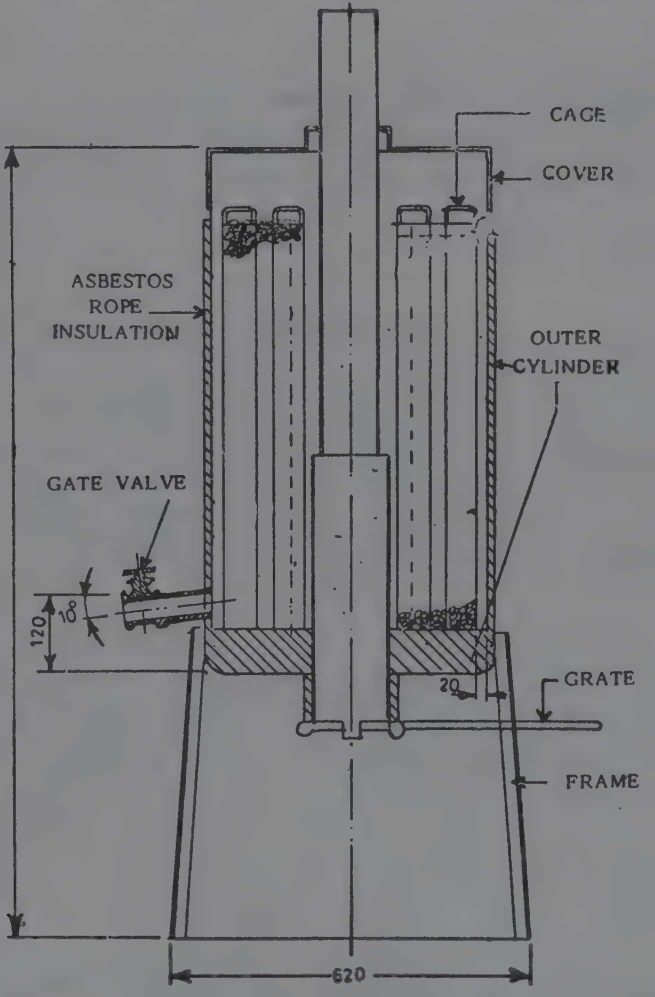
Tomato seed needs special treatment since it is surrounded by mucilaginous material.

The machine can extract seeds at the rate of 5.49, 3.78, 9.42, 4.68, 3.60, 6.60, and 1.42 kg seeds per hour of brinjal, tomato, chillies, summersquash, watermelon, squashmelon, and cucumber respectively. The maximum seed loss is to the extent of 5.86 per cent in tomatoes, followed by 5 per cent in cucumber.

Seed germination is higher with mechanical extraction in comparison to manual extraction.
(Research and Industry 34(1), 1989, 89)

207 Soyabean blanching unit

Soyabean is a rich source of protein (40%) and oil (20%). However, it also contains anti-nutritional factors like trypsin inhibitor, hemaglutinin, saponins and allerginins, which should be taken care of prior to human consumption. Most of these factors being thermolabile could be easily removed by simple moist heat treatment. Soyabean use would become more wide-spread if it could be processed in rural areas. A low cost blancher designed and developed at Central Institute of Agricultural Engineering, Bhopal is a step in this direction.



Design

The blanching unit (Fig 1) is made of 22-guage GI sheet metal with two concentric cylinders. The central cylinder serves as a burning-cum-heat-exchanging unit, and its lower and upper portions have different diameters - 12 cm and 10 cm, respectively. The diameter of the outer cylinder is 45 cm. The material for processing is kept in hot water held in the annular space between the two cylinder. The outer cylinder is insulated with flattened asbestos rope and plaster of paris. For convenience of loading and unloading and to facilitate reuse of the hot water, the soybean dal is kept in four cages made of perforated MS sheet with zinc or chromium plating. A gun-metal valve is provided to drain the water after processing.

Operation

About 70 l. of water is filled in the annular space and heated to boiling temperature. The four cages with 5 kg soybean dal each are then lowered in the boiling water and the temperature of 100 C is maintained for 60 min. The cages are then taken out. The soybean after this treatment is fit for consumption. The treated soybean is finally dried to make flour.

Economics

The capacity of the unit is 100 kg of soybean per day. The fuel requirement is 3.5 kg per batch of 20 kg soybean. The cost of the unit being about Rs. 1,300, the cost of processing works out to only about 20 Paise/kg. The thermal efficiency of the unit is as high as 31.18% with reuse of hot water for processing subsequent batches.

The unit uses agricultural waste as fuel. It is very simple to operate. It can also be used for parboiling of paddy and wet heat treatment of a variety of cereals and pulses at the rural level.

For details write to: R.T. Patil, Central Institute of Agricultural Engineering, Nabi Bagh, Bersia Road, Bhopal-462018.
(Invention Intelligence August 1989, 378-379)

208 Improved mobile corn sheller

In response to the need to reduce shelling losses due to technical deficiencies, an improved mobile corn sheller has just been developed by NAPHIRE in the Philippines under the ASEAN-Australia Economic Cooperation Programme.

Before the improved design was made, three (3) types of existing shellers; the crushing, non-crushing and semi-crushing type shellers were tested and evaluated to determine their operational deficiencies. The design of the improved mobile maize sheller comes from the results of the performance testing and evaluation conducted.

Major improvements include modification in the power transmission system of the existing design resulting in a more compact design for better mobility, baffles and rasps on the shelling concave to increase shelling recovery; and application of suction air to separate light impurities from the shelled grains.

All these modifications make the new machine more efficient and easy to operate and maintain.

This prototype was field tested in Isabela, Philippines. Results from the evaluation revealed that the improved machine performs better than existing commercial shellers. It obtained the highest efficiency of 97.11%; lowest mean unshelled loss of 0.14%; lowest mean damaged grain of 2.75% and the lowest mean impurities of 0.79% among the crushing type sheller when shelling at 22.35% moisture content corn.

Considering the losses due to shelling which as in the case of the Philippines in 1986 was estimated at 17,766.75 metric tons equivalent to US $ 5.14m, savings through the use of the new improved corn sheller could result into millions of dollars.
(Asean Food Handling Newsletter No.32, 1989, 9)

209 Hygienic cleaner for industry

Three-in-one, CHLODET liquid, a balanced combination of Active Chlorine plus Wetting and Penetrating agents, is specially designed for achieving the required high - standard of hygiene and cleanliness in Dairy and Food Processing industries very economically.

Because of its unique ability to penetrate even the organic soil and kill the micro-organisms, the action of CHLODET is uniform and destroy all types of micro-organisms, including that which are not affected by other disinfectants. The broad spectrum of CHLODET action includes bacteria, bacterial spores, viruses, algae, fungi, moulds and yeast. It also reacts with the putrid organic waste matters and destroy the foul odors effectively.

For further details, contact: Coronet Corporation, 3, Nilkanth Sadan, Peru bagh, Aarey Road, Bombay 400 063.

210 Powder sifter

The Rota-Sift is a centrifugal unit used for the continuous separation of dry or moist materials, even those that tend to ball or agglomerate. It can handle a variety of chemicals, pharmaceuticals, foods, dairy products, animal feed and powders or granules. Material is uniformly fed into the cylindrical sifting chamber by means of a feed screw which discharges the material into a rotating helical paddle. Centrifugal force accelerates the movement of the particles against the screen. The rotating paddles, which do not contact the screen, break up soft agglomerates and propel individual particles through the screen. Oversized particles, hard lumps and trash are ejected and pass directly to the discharge spout.

For more details write to: Age Technologies Private Limited, 712 GIDC Makarpura, Vadodara, Gujarat 390 010.
(Chemical Products Finder 8(2), 1989, 26)

211 Carton sealing machine

The 3 AM Econopack automatic taping machine from ITW-Signode can apply BOPP or rigid PVC pressure sensitive sealing tape on the top and bottom of cartons simultaneously. Being a twin mast design and having a top and bottom positive belt drive, full closure of flaps is ensured. Specially designed machines are also offered for non-standard applications. The carton sealing machine is ideally suited for high speed, effective sealing of centre meeting cartons in industries like food processing, drug and pharmaceutical, breweries and distilleries etc. Econopack is backed by Nagarjuna Signode's servicing personnel and total spares availability.

For further information write to: Nagarjuna Signode Ltd., Nagarjuna Hills, Panjagutta, Post Box 1520, Hyderabad 500 482.
(Industrial Products Finder 17(9), 1989, 36)

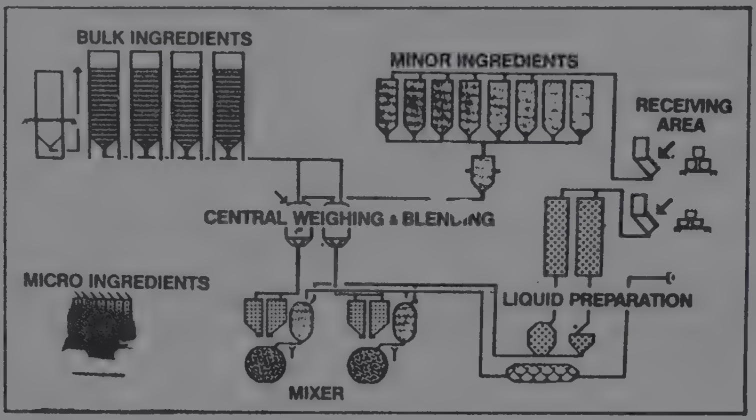
212 Packing of confectionery

Autowrap BD 16/32 is a versatile and fully automatic vertical form-fill-seal type packaging machine. This machine can be used for packing free flowing solids like powders, tablets, grain, toffees, etc., as well as liquids like milk or oil depending on the filling attachment. Laminated or co-extruded or virgin films can be used for pouch forming. Constant heat sealing or impulse heat sealing can be used on this machine depending on the requirement. In case of impulse heat sealing, chilled water is required to cool the seal. The film roll is mounted at the rear of the machine on a quick change-over mounting bar. The film is guided over different guide rollers on to the forming shoulder. When the film passes over the forming shoulder it assumes a tubular shape on the forming tube. Here the centre sealing jaw seals the side edges of the film to form the tube. This tube is pulled with the help of draw-off belts. The formed tube is now sealed at the bottom with the help of cross sealing jaws. As soon as sealing starts, the filling device fills material into the pouch. At the end of cross sealing, a knife is actuated to cut the tube to separate pouch from the tube. After completion of filling and sealing, the tube is again pulled with the help of draw-off belts to form the next pouch and the cycle repeats. The machine works on 415 V 50 Hz 3-phase 4-wire AC supply. Different systems of the machine are working on mechanical and pneumatic principles with the electrical and electronic controls. Provision for photo-mark sensing device and date coding device can be made on the machine. The weigher is designed to handle discrete product, i.e product of more than one gram unit weight. The weigher can be used to feed a packaging machine or a container filling line. Each weighing system consists of a load cell with weighing container, a set of feeding trays, pre-weighing system, hopper and electronic controller.

For more details write to: Nichrome Metal Works, 46, Dr. Ambedkar Road, Near Sangam Bridge, Pune, Maharashtra 411 001.
(Chemical Products Finder 8(2), 1989, 10)

213 Bulk storage and automated pneumatic handling of ingredients for food and chemical industry

Dietrich Reimelt, Fed Republic of Germany offers custom built systems for major, minor and micro ingredients that will ensure saving of time and exact control of material, simplify process and incrase plant performance, productivity and consistency of end product. Reimelt outdoor silos are provided with well ventilated thermo-protection filter room which helps to minimise condensation build-up inside the upper surface of stored materials and provide weather protection to the filters. The air can be preconditioned for regions having high humidity or when handling hygroscopic materials. Depending upon the raw materials stored, either fluidised bed, vibratory bottom or mechanical discharge aids are used. The fluidising system is unique for its design, in that it allows silo aeration and guarantees first-in, first-out mass flow discharge. Equipment offered are bag dump and bulk tanker receiving stations, indoor/outdoor silos, pressure/vacuum conveying system, sifters, mixers/pneumatic blenders, rotary airlocks, diverter valves, filters, metering screws, electronic weigh scales and integrated computerised system which controls raw material conveying of dry and liquid products, true recipe preparations, weigh-scale tolerance and inflight compensation, logging of total material consumption, work preparation with immediate accessable memory and material flow via video display and printout.



For more details write to: D Reimelt KG, 6 Prachi, Off Bhandarkar Road, 913 S Nagar, Pune, Maharashtra 411 004.
(Chemical Products Finder 8(2), 1989, 26)

214 Food extrusion equipment

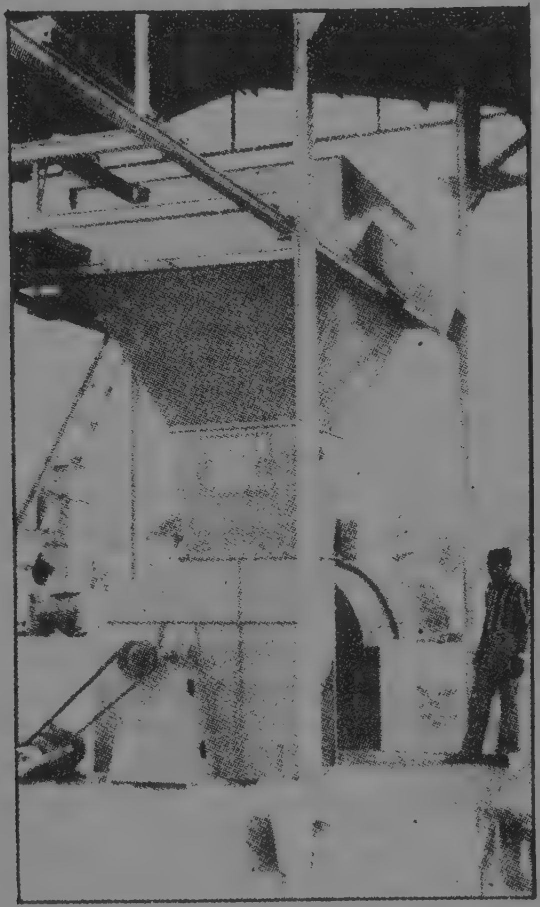
Age Technologies has developed a range of equipment for snack and pet food extrusion – to manufacture various shapes from a range of possible corn/rice/potato/soya based ingredients. The heart of the system is the extruder cooker which employs a unique dry extrusion process, creating heat through pressure and friction. Heat and pressure are used to cook and expand ingredients, gelatinise starch, destroy inhibitors where present, modify or sterilise by products, and dehydrate moist waste materials. With this dry extrusion process, no additional heat source is required as it relates to the extruder function. Auxiliary equipment is also available from Age Technologies to clean and mix raw materials, cool extruded products, and apply flavour.

For more details write to: Age Technologies Private Limited, 712 GIDC, Makarpura, Vadodara, Gujarat 390 010.
(Chemical Products Finder 8(1), 1989, 90)

215 A new solar dryer for rice

A new type of solar dryer for rice is now being manufactured in Sri Lanka as a result of an energy project arranged by the CHOGRM Consultative Group on Energy assisted by the Commonwealth Secretariat's Industrial Development Unit (IDU).

The project is reported to be improving the quality of parboiled rice, giving paddy farmers a better rate of return and reducing energy requirements for drying. The solar dryer is proving to have many advantages over the conventional mechanical type commonly imported to Sri Lanka. It is much faster, requires 30 per cent less energy and has lower operating and capital costs. (It uses paddy husk as a cheap fuel and reduces environmental pollution). It also reduces discolouration and breakage of grains.



The dryer, of the forced convective type and with a capacity of 0.35 tonnes, can be used for drying parboiled rice and raw paddy in preparation for milling. It consists of three main elements: a solar-regenerated dessicant (silica gel) cooler for storage of raw paddy; a low-cost batch type fluidised bed dryer for parboiled rice, and an efficient furnace, fired by rice husks, to heat air for the drying operation.

The design has its roots in Australia. After gaining the IDU's approval for the designs, the engineers at the Rice Processing Research and Development Centre (RPRDC) of Sri Lanka fabricated and tested the dryer, making final modifications.
(Asia-Pacific Tech Monitor March-April 1989, 5)

216 Agitated vacuum pan dryer

An agitated vacuum pan dryer which mixes and dries in one operation has been developed by a British company. The Calmic vacuum-pan dryer has been designed to meet the needs of the pharmaceutical, chemical and food industries, and is particularly suitable for handling heat sensitive materials. Available in a range of sizes, the dryer is of crevice free stainless steel construction with mechanical seals. For easy access to the drying compartment, the lid can be automatically lifted or swung to one side on a davit arm. To eliminate dust hazards, the vacuum system can be used to assist product feed through the loading port. Heating can be by steam or heat transfer oil, and discharge is through an automatic valve.

For further information write to: Euro-Vent Ltd., Calmic Division, Govan Road, Fenton Industrial Estate, Fenton, Stoke on Trent ST4 2RS, U.K.
(Industrial Products Finder 17(8), 1989, 40)

217 Grinding plant

Batliboi offers a complete spice grinding plant comprising cleaning, pulverising, mixing and packaging systems. The plant has been designed for pulverising spices to the finest quality without affecting their vital properties. Its various stages of operation are cleaning of spices by eliminating particles and impurities like stones, sand, stems, sticks, strings, etc. and thereafter pulverising the same through the high-tech pulverising system with auto-servo control to monitor the feed rate uniformly. This minimises chocking as well as clogging of the oilbased materials. It also includes a built-in heating system which obviates the conventional sun-drying process. Sieving machine ensures separation of coarse and fine powder. The next operation takes place in the mixing unit in which the mix-masala and the curry powder are prepared. Finally the powder is dosed and packed in a fully automatic packaging machine in 50 g, 100 g and 250 g packets. Batliboi has set up such plants for a number of spice manufacturers in the country. The company also offers systems for grinding foodstuffs and herbs, the latter for ayurvedic medicines. The standard pulverising equipment like pre-crushers, hammer mills, pin pulverisers and micro pulverisers find applications in food processing, pharmaceuticals, chemical and plastics industries.

For more details write to: Batliboi and Company Ltd., P.O. Box 479, Bombay 400 001.
(Chemical Products Finder 8(2), 1989, 6)

218 Ultrafine filters

Kumar Process Consultants and Chemicals manufactures a range of filter housings and cartridges for ultrafine filtration requirements. The cartridges are rated for absolute retention up to 0.01 micron. Spiral wound, pleated or sintered cartridges are available in such materials as polypropylene, nylon, PTFE, glassfibre, sintered stainless steel, sintered bronze, etc. Filter housings are made in stainless steel, PVC, PVDF, PP or polycarbonate materials. The ultrafine filters are suitable for ultrafiltration of several demanding products in the chemical, food and beverages industries. Also manufactured are a range of air sterilisation and laboratory filters.

For more details write to: Kumar Process Consultants and Chemicals Pvt Ltd., Botawala Bldg, No.2, 2nd floor, Room No.1, 8 Horniman Circle, Bombay 400 023.
(Chemical Products Finder 7(12), 1989, 86)

219 Improved oil expeller

A prototype of an improved oil expeller has been designed and developed at the Mechanical Engineering Research and Development Organisation (MERADO), the Central Mechanical Engineering Research Institute, Ludhiana.

Most of the 36,000 odd oil expellers now in use in the country have frequent breakdown and consume more power. The oil content of the cake produced in these expellers ranges from eight to 12 per cent. The high content of residual oil is attributed to inefficient design, poor manufacturing technology and use of low grade materials.

In order to increase the amount of oil expelled, a project for development of modern oil expeller with a crushing capacity of 10 tonnes per day was undertaken at the MERADO as part of the technology mission on oil seeds. The prototype developed at MERADO leaves residual oil of four to six per cent in the cake and consumes less power than the expeller now in use.

Working life of the wearing components has been improved by choosing proper materials, ensuring proper metallurgical control and using hard surface coatings. Similarly, power transmission efficiency has been improved by re-designing the gear box and auto lubrication of all friction surfaces.
(Economic and Commercial News 19(16), 1989, 13)

220 Spotlight on freshness

Scientists say they can tell whether a melon is ripe by how much light it absorbs. A US Agriculture Department scientist has developed a meter the size of a breadbox that shines near-infrared light on a melon and, depending on how much it absorbs, determines how sweet it is.

"The more infrared absorbed, the sweeter the fruit", said Dr.Gerald G Dull, who works in the department's agricultural research service. "Sweetness is the primary measure of a fruit's ripeness", he said.

Eventually shoppers will be able to test their own fruit with flashlight-sized meters. But in the meantime, he is trying to perfect the device for fruit growers and shippers.

The meter is now being tested in the field at the University of Georgia's coastal plains experiment station in Tifton, Ga.

The sweetness of melons of different types, sizes and stages of ripeness will be measured and the results compared with actual chemical analyses to further calibrate the device.

Dr.Dull said he and Gerald S. Birth, who recently retired from the department, are working to refine light meter technology to measure ripeness in a variety of fresh produce. So far, tests have been successful on onions and papayas. "Peaches and plums are next," he said.
(Deccan Herald 13 July 1989, IV)

PACKAGING

221 Metallised paper

Champion metallised papers will be introduced in the country for the first time by Champion Packaging Industries.

This is a direct and cost saving substitute to the aluminium foil laminates being currently used. This has just a minute amount of aluminium deposited on its surface to give it the appearance of laminated aluminium foil.

The beauty of the metallisation technique is that it eliminates the need to laminate aluminium to paper and requires only a fraction of the aluminium needed for foil.
(Financial Express 4 June 1989, 7)

ANALYSIS

-Nil-

COMMERCIAL INTELLIGENCE

PRODUCTION (Raw Material)

222 All-India final estimates of crops, 1987-88

Production: '000 tonnes

	Area	Production
Potato	885.4	14,138.4
Black pepper	158.5	49.2
Chillies	738.0	574.6
Ginger	53.7	135.5
Guarseed	1,108.2	148.0
Tapioca	269.7	5,212.5
Cardamom	115.73	9.49
Coriander	484.5	243.0
Garlic	79.4	286.7
Turmeric	107.7	294.9
Banana	289.6	4,767.1
Sweet potato	164.0	1,346.7
Onion	259.1	2,553.5
Coconut	1,428.7	7,562.3 (in million nuts)

(**Agricultural Situation in India March 1989, 1087**)

223 All-India final estimate of oilseeds production, 1986-87

(Production in tonnes)

Groundnut	60,78,765
Sesamum	4,43,179
Rapeseed and Mustard	27,14,383
Nigerseed	1,32,097
Sunflower	4,35,596

(**Agricultural Situation in India, April 1989, 59-79**)

224 All-India final estimates of coconut production in 1986-87

(Production in thousand nuts)

Andhra Pradesh	1,98,833
Assam	68,711
Goa	1,06,300
Karnataka	10,72,378
Kerala	30,68,025
Maharashtra	76,326
Orissa	1,29,995
Tamil Nadu	13,80,800
Tripura	2,750
West Bengal	2,23,760
Andaman & Nicobar Islands	34,438
Lakshadweep	24,600
Pondicherry	18,063
All-India	64,04,979

(Agricultural Situation in India, April 1989, 80)

225 Rise in milk production

Milk production in the country has risen from 20.0 million tonnes in 1960-61 to 46.0 million tonnes in 1987-88 and 48.7 million tonnes (anticipated) in 1988-89. This shows the overall increase in productivity of milch cattle and buffaloes that has taken place in the meantime.

(Economic and Commercial News 19(32), 1989, 1)

PRODUCTION (Industrial)

226 Production of processed foods

(Tonnes)

Product	1986	1987	1988
BAKERY			
Biscuits	137500	139000	141000
Bread	123000	125000	129000
SOFT DRINKS			
(million bottles)	1770	1800	1950
COCOA PRODUCTS			
Chocolate	7700	7850	8100
Cocoa powder	250	265	290
Drinking chocolate	350	365	385
DAIRY PRODUCTS			
Butter	12000	12250	12375
Ghee	22000	22250	22700
Condensed milk	7800	8200	N A
Baby food	52000	53500	53800
Malted milk food	25200	25500	26760
Ice-cream	10600	10800	11100
FRUITS AND VEGETABLES	56700	58000	60000
MEAT PRODUCTS	21000	21500	22700
INSTANT FOODS			
Coffee	6000	6500	6825
Tea	1172	1250	1295
Macroni/Noodles	7850	8000	8400
Snack foods	240	255	267

(The Economic Times 10 August 1989, II)

227 Alcohol production in some states

(in lakh tonnes)

State	1987-88	1988-89 (Est.)
Maharashtra	1622	1980
Uttar Pradesh	1746	3087
Tamil Nadu	640	954
Karnataka	452	498
Andhra Pradesh	600	747
Gujarat	316	511
Haryana	166	180
Punjab	199	318

(Chemical Weekly 34(44), 1989, 99)

228 Production of vanaspati

	(Lakh tonnes)
1986-87	9.18
1987-88	9.80
1988-89	9.56

(The Economic Times 24 August 1989, 9)

229 Rise in iodised salt output

The production of iodised salt touched 2.014 million tonnes during 1988-89 as against 1.687 million tonnes during 1987-88, thereby registering an increase of 19.4 per cent.

The Government had, it may be recalled, decided to iodise the entire edible salt in the country by 1992, in a phased manner. It had also decided to subsidise iodised salt production by way of free supply of potassium iodate. The programme has already been included in the Seventh Five Year Plan with an outlay of Rs.210 million. In fact, in one of the biggest health care programmes, about 5.2 million tonnes of salt is to be iodised by 1992 to cover a population of 800 million.

In order to encourage the production of iodised salt, the Government has given certain incentives to iodised salt manufacturers viz., bearing the cost of chemical used in iodisation, priority for movement of iodised salt by Railways, free technical assistance and quality control. In order to ensure proper level of iodisation, quality control laboratories have been established at various centres in Gujarat, Rajasthan, Tamil Nadu and Maharashtra. It is one of the health care programmes which has been successfully implemented since its revamping in 1986. Central Salt Department, under the Ministry of Industry, has been made the nodal agency for monitoring production, distribution, quality control and subsidy payable to iodised salt manufacturers.
(Economic and Commercial News 19(27), 1989, 11)

EXPORT

230 Cashew exporters cry foul

The cashew industry has suffered a major setback in the wake of the government decision to withdraw the cash compensatory support (CCS) to value-added cashewnuts in consumer packs.

The cashew exporters point out that this decision has come at a time when Indian cashew was making its presence felt in the global market.

According to industry sources, few others have been able to carve out a niche in the US market, conforming to the standards of the US Foods and Drugs Administration. With the government's new move, the country would lose substantial foreign exchange, it is felt.
(Business World 9(3), 1989, 27)

231 Export of food commodities

Significant increases in the production of fruit and vegetable products, steady growth of licensed units and tremendous progress of poultry industry are some of the achievements of the newly established Ministry of Food Processing Industries during 1988.

According to the Annual Report of the Ministry, during the period January to December, 1988, export of fruit and vegetable products were 49,389 tonnes valued at Rs.598.9 million. The major items of export were fruit juices, pulps, jams, pickles and chutneys, canned fruits and vegetables, concentrated pulps and juices, dehydrated vegetables, frozen fruits, pulps and freeze-dried green pepper.

Milk Products

According to the Report, indigenous production of milk powder and infant milk food has risen from 22,000 tonnes in 1970 to about 100,000 tonnes in 1987, which has certainly laid a strong base in milk processing for the Eighth Five Year Plan. During the year six letters of intent were issued for manufacture of milk powder, malted milk food, butter, ghee etc., to milk product's manufacturing units in the cooperative sector. Four letters of intent were converted into industrial licences for manufacture of milk powder, baby food, condensed milk, casein etc. There are at present 83 milk product's manufacturing plants established in public, co-operative and private sector.

During the year 1988, the estimated production of milk powder, including infant milk food, was about 1,40,000 tonnes, malted milk food including malted food about 32,000 tonnes and condensed milk about 6,100 tonnes.

Meat and Meat Products

The Ministry proposes to improve and modernise the processing facilities for meat and meat products in order to meet the demand for internal consumption as well as for export of clean and wholesome meat products.

During the last three decades, the poultry industry has made tremendous progress and grown into an organised and highly productive agro-based industry. It achieved a production of 17000 million eggs and 120 million broilers in 1988-89. A few modern poultry processing plants have also come up recently in the private sector to produce poultry meat products.
(Economic and Commercial News 19(19), 1989, 3-4)

232 Non-basmati rice - Special norms for exports

The Government has decided to devise special procedure for the export of non-basmati rice.

According to the new procedure, the entire ceiling of non-basmati rice will be placed at the disposal of Agricultural and Processed Food Export Development Authority (APEDA).

APEDA will issue a ceiling slip to the exporters on the basis of registration of contracts with it backed by 100 per cent letter of credit or advance payment received in full subject to production of bank certificate from the nationalised/scheduled bank covering 100 per cent f.o.b. value against specific order or against revolving letter of credit.

The exporters will then approach the concerned port licensing authority and submit the ceiling slip issued by APEDA. On presentation of the slip, the port authority will issue export licence expeditiously and, in any case, not beyond 48 hours after presentation of the slip. Export licence will have a validity period of six months from the date of issue or up to March 31, 1990, whichever is earlier.

On the basis of the licence, exports will be allowed by the customs authorities, says an officical release.

The release says that no registration of contracts will be made by APEDA after March 31, 1990.

APEDA will stop issuing the slips as and when the ceiling is exhausted. It will not issue them after March 31, 1990, even if the quantity of ceiling is left unutilised, says the official notification.

As soon as the ceiling is reached, it will be reported to the Ministry of Commerce immediately by APEDA.
(Financial Express 23 June 1989, 1)

233 Indian sea food exports

More and more people in Japan, France, Spain Singapore and a host of other countries, are relishing Indian sea food, reports PTI.

The volume and value of sea food export, mounted from 83,651 tonnes (Rs. 39,799.82 lakhs) in 1985-86 to 99,777 tonnes (Rs. 59,785.38 lakhs) in 1988-89, signifying its increasing acceptance overseas, the Marine Products Exports Development Authority (MPEDA) sources, here, said.

The comparative export figures during the past three years are: 83,651 tonnes valued at Rs. 39,799.72 lakhs in 1985-86, 85,843 tonnes valued at Rs. 46,067.28 lakhs in 1986-87 and 97,179 tonnes valued at Rs. 53,120.39 lakhs in 1987-88.

The level of export is about to touch Rs.600 crores, during the current year and the Seventh Plan target of Rs. 700 crores is likely to be achieved by early 1990, sources said.

The major countries which export Indian sea food are Japan, the USA, France, Greece, Spain, Italy, Belgium, the United Kingdom, Netherlands, UAE, Kuwait, Sri Lanka, Singapore and Hong Kong.

Sources said that frozen shrimp is the leading export item (57 per cent in volume and 79 per cent in value). Frozen squid occupies the second place, with 16 per cent and six per cent in volume and value respectively.

The MPEDA, is engaged in the task of strengthening and diversifying the production base of Indian sea food for export and has set up an ambitious annual export target of Rs. 1,100 crores in Eighth Plan.
(The Economic Times 22 July 1989, 2)

234 No UAE ban on Indian meat

There is no ban on the import of any brand of minced meat from India to the United Arab Emirates, the Dubai-based president of the All India Meat and Livestock Exporters Association, Mr.Suresh Subberwal, said on Tuesday.

In a statement issued here to clarify 'the misunderstandings on the subject', he said he had met the authorities concerned in the UAE and had been told that imports of minced meat from India had been cleared after appropriate tests

"I would like to confirm that as it stands, there is no ban on any brand of meat from India in the UAE", Mr.Subberwal said.

A similar statement was also issued by Mr.Pravidn Varma, Consul in the Indian Consulate General in Dubai.

He said "certain misunderstandings had blown the issue out of proportion" and that in any case, the Consulate General had officially been told that there was no ban on the imports of Indian meat.
(Financial Express 26 July 1989, 3)

235 Salt exports rise

There has been a 50 per cent increase in the export of salt during 1988-89. Exports in the year touched a level of 660,000 tonnes as compared to 430,000 tonnes in 1987-88. This increase has been attributed to several measures taken by the Ministry of Industry.

Significantly enough, India has exported 134,000 tonnes of salt to Japan during 1988-89 despite the fact that Japan is not the traditional importer of Indian salt. Efforts are being made to increase the export of salt to a million tonnes by the turn of this decade.
(Economic and Commercial News 19(25), 1989, 9)

236 Spices export

The export of spices recorded a 34 per cent increase during 1988-89 over the exports in the previous year, achieving the third best performance in the history of Indian spices industry.

The volume of export increased from 70,279 tonnes during 1987-88 to 94,437 tonnes during 1988-89.

The foreign exchange earned from spices, however, fell by 5 per cent during 1988-89 compared to the best earning of Rs.298 crore achieved during the previous year because of the fall in the average unit export price of pepper.

During 1988-89, the export earnings were Rs. 282.80 crore compared to Rs. 298 crore during 1987-88. The unit price of pepper declined to Rs.45 a kg during 1988-89 compared to Rs.58 per kg during the previous year resulting in a shortage of Rs.53 crore, according to a trade analysis conducted by the Spices Board.

While analysing the commodity-wise targets and achievements in terms of quantity, pepper, cardamom (large), ginger, turmeric and miscellaneous spices recorded better performance during 1988-89 exceeding the targets set for the year.

According to the export analysis comparing with the previous year, the export of pepper increased marginally from 41,011 tonnes valued at Rs. 240.58 crore to 41,065 tonnes valued at only Rs.187.78 crore marking a fall in terms of value due to the fall in unit export price.

Export of cardamom increased from 425 tonnes valued at Rs. 4.1 crore to 1,218 tonnes valued at 12.14 crore. While the export of chillies decreased from 6,122 tonnes to 5,424 tonnes, the earnings increased from Rs.8.33 crore to Rs.12.06 crore.

Ginger exports increased from 2,628 tonnes (Rs.4.89 crore) to 5,198 tonnes Rs.9.22 crore, Turmeric from 8,747 tonnes (Rs. 9.23 crore) to 16,518 tonnes (Rs. 17.37 crore), curry powder from 2,559 tonnes (Rs.4.38 crore) to 2,735 tonnes (Rs. 5.04 crore), seed and other spices from 8,359 tonnes (Rs. 11.60 crore) to 21,792 tonnes (Rs. 20.88 crore and spice oil and oleoresins from 428 tonnes (Rs. 14.97 crore) to 487 tonnes (Rs. 18.30 crore).

The poor export performance of cardamom against a target of 2,750 tonnes set for the year was due to less demand from the Middle East market primarily on account of uncompetitive Indian price against Gautemalan offer and the predominance of domestic market with higher price.

While the quantity of spices exported in the 1960s ranged between 44,000 (1960-61) tonnes to 65,000 (1969-70) tonnes, in the 1970s it varied between 48,000 (1970-71) tonnes to 11,500 (1979-80) tonnes. Thereafter in the 1980s the quantum of export had recorded a low of 68,375 tonnes in 1981-82 and a high of 94,437 tonnes during 1988-89.

The export earnings which stood at the level of Rs. 16 crore in 1960-61, rose to Rs. 34 crore in 1969-70 and further to Rs. 155 crore in 1979-80.
(Deccan Herald 21 August 1989, 15)

237 Export levy on gum karaya

The recent 20 per cent export levy on gum karaya, a minor forest product that earned handsome revenue for the State Girijan Cooperative Corporation, has dampened the market. The levy has been introduced since May 5 and traders from Bombay have been shying away from buying the product.

Addressing newsmen here on Friday, Mr.L.B. Dukku, Chairman of the Corporation, appealed to the tribal co-operative marketing development corporation to take up the issue with the concerned Ministry in order to reduce the levy to a reasonable five per cent since the cause of tribals from whom the purchases are made is jeopardised.

Procurement of gum karaya by the State corporation during 1987 was Rs.107 lakhs. It went up to Rs. 271 lakhs in 1988 and this year until May, it was Rs.182 lakhs according to Mr. Dukku.
(Financial Express 18 June 1989, 6)

238 Export of oilseed meals may exceed Rs.500 crores

Export of oilseed meals may exceed Rs. 500 crores this oil year (November to October). The official projection of export earnings during the current year with the previous year's figures in brackets are: soyabean meal Rs. 270 to Rs. 350 crores (Rs. 86 crores), rice bran extraction Rs. 70 crores (Rs. 27.4 crores), rapeseed extraction Rs. 70 crores (Rs. 3.9 crores), and groundnut meal Rs. 45 crores (nil).

According to Dr.P.V. Shenoi, Director of the technology mission on oilseeds, the export trade has been endeavouring hard to exploit the firmness in the international market due to reduced supplies from the US (soyabean meal) and China (groundnut).

Prices of groundnut extraction have already started an upward trend, due to the export prospects.

Rape/mustard seed crop is estimated at over 40 lakh tonnes and summer groundnut crop at over 22 lakh tonnes (in shell). Observers say that the total production of nine oilseeds is now expected to be around 160 lakh tonnes.
(Poultry Guide 26(4), 1989, 98-99)

239 Issue of advance licences

The commerce ministry proposes to issue advance licences indicating the foreign currency both in CIF (cost including freight) value of imports and FOB (free on board) value of exports.

The licences under this proposal may be issued in the same foreign currency with the conditions that there is a minimum stipulated value addition and the foreign exchange realisation is also in the same currency.

The proposal will have to be approved by the ministry of finance before it could be implemented, according to official sources.

The proposal has been mooted by the commerce ministry on a demand from exporters that the advance licence-exchange be indicated on the licence itself so that the banks and the customs authorities may ignore any excess value due to fluctuations in exchange rates of foreign currencies.

The commerce ministry feels that the proposal would, to a considerable extent, solve the problems faced by the exporting community.
(The Economic Times 20 August 1989, 1)

IMPORT

240 Sugar to be imported

Sugar production plans having gone awry, the country will import about 500,000 tonnes of sugar this year, reports UNI.

Contracts for import of 200,000 tonnes of sugar are expected to be concluded shortly, according to informed sources.

Although India is the largest producer of sugar in the world, the current forecast of 9,100,000 to 9,200,000 tonnes of sugar output this year is far below expectations. The earlier estimates had projected an output of 9.8 million tonnes which was expected to go up to ten million tonnes. The industry had projected an even higher figure.

The revision in the production figures this year is attributed mainly to two factors - lower recovery of cane in many states because of weather aberrations, and diversion of cane to gur and khandsari units offering much higher prices than the sugar mills.

Undoubtedly, sugar production has been showing an increase in the past few years, from 7,017,000 tonnes in 1985-86 to 8,502,000 tonnes idn 1986-87 and 9,110,000 tonnes in 1987-88.

Alongside, however, internal consumption has also been showing a steady rise, thanks to a conscious policy of liberal increases in the free sale quota. Indigenous consumption rose from 7,890,000 tonnes in 1984-85 to 8,353,000 tonnes in 1985-86, 8,775,000 tonnes in 1986-87 and further to 9,333,000 tonnes in 1987-88.

Together with the imports and the opening stocks, the total availability of sugar in 1987-88 sugar year was 11.83 million tonnes.

Against this, this year's availability is estimated at only 11.56 million tonnes.
(The Economic Times 7 June 1989, 1)

241 Imports of edible oils

(lakh tonnes)

Oil year (Nov-Oct)	Total imports	Supplies to Vanaspati	Supplies to PDS*
1986-87	16.45	4.80	8.89
1987-88	18.19	6.17	10.75
1988-89	8.50	N.A.	N.A

*PDS: Public Distribution System
(The Economic Times 24 August 1989, 9)

TRADE INFORMATION

242 India - British co-operation in food processing

India and Britain have reached an agreement on setting up export-oriented joint ventures in the food processing industry in Indian.private and public sector, reports PTI.

The minister for the recently constituted ministry of food processing, Mr.Jagdish Tytler, who held discussions with British ministers and leading food processing industrial groups in Britian in the last two days, has offered the British firms 40 per cent equity.

The agreement envisages transfer of British expertise to Indian food processing firms in training facilities for packaging, food preservation, quality control, laboratory testing, and laying down of standards in hygiene.

Atleast eleven British firms have come forward and their representatives will be accompanying a high level ministerial delegation to India soon to identify areas of possible co-operation for joint venture.

Mr.Tytler told newsmen the agreement was a major breakthrough for the food processing industry and would help in providing the farmers remunerative price for their produce, generating employment in rural and semi-urban areas and saving the wastage of fruits and vegetables.

Replying to questions, Mr.Tytler said "we are acquiring British technical knowhow only for export purposes".
(The Economic Times 6 July 1989, 1)

243 Policy for food processing units released

The policy for setting up units in the food processing sector has been further liberalised by the Government. The MRTP and FERA companies will henceforth be allowed to set up units in categories B and C backward districts.

Earlier it may be recalled this facility was available for category A backward districts only.

According to a government press release issued in New Delhi recently, MRTP and FERA companies manufacturing canned fruits and vegetable products, protein and processed food, vegetable based weaning foods, marine products and cattle feed can now locate units in category B and C backward areas. Till now, under its delicensing policy, the government had allowed these MRTP and FERA companies to set up such units in category A backward areas only.

This additional facility has been provided because all food processing industries other than milk food, malted food and flour excluding items reserved for the small-scale sector have been included in Appendix I industries, which are also open to MRTP and FERA companies. According to the release, other terms and conditions of delicensing stipulated that have been amended from time to time remained unchanged.
(Economic and Commercial News 19(19), 1989, 10)

244 Food processing industry panel set up

An exclusive development council for the fruit and vegetable processing industries has been constituted by the government. This was disclosed by the Minister of State for Food Processing Industries, Mr.Jagdish Tytler to the Parliamentary Consultative Committee attached to his Ministry.

According to the minister, the council would identify the problems of the industry and advise the government on the remedial measures to be taken. He said several companies in the US and UK have expressed their willingness to set up food processing industries in the country.

One of the committee members suggested that the food processing units in rural areas be linked to the Khadi and Gram Udyog Organisation so that loans at lower rates of interest could be made available.

Mr.Tytler said the export of fruit and vegetable products in 1985 was of the order of 50,000 tonnes valued at Rs. 598.9 million. This incidentally, was more than double the level eight years ago when 29,000 tonne products worth Rs. 220 million was exported.
(Economic and Commercial News 19(30), 1989, 11)

245 Support price for copra fixed

The government has fixed for the first time a minimum support price for copra of fair average quality at Rs. 1,500 per quintal for the 1989 season.

This follows the government decision to bring copra under the ambit of its support price policy with a view to protecting the interests of coconut growers. The decision is in accordance with the recommendations of the Commission for Agricultural Costs and Prices.

Announcing this in both the Houses of Parliament on Friday, Union agriculture minister Bhajan Lal said in a statement that he was confident that the minimum support price fixed for 1989 season would safeguard the interests of coconut growers.

The minister said the National Agricultural Co-operative Marketing Federation of India Limited (Nafed) was designated as the Central nodal agency to purchase copra during the 1989 season at the minimum support price, as and when needed.

Such purchases would be undertaken by Nafed in collaboration with state co-operative marketing agencies or the agencies designated by the state governments.

Mr.Bhajan Lal said the losses, if any, incurred on purchase and sale operations would be fully reimbursed to Nafed by the Union government.
(**The Economic Times** 22 July 1989, 1)

246 Increase in seafood consumption

Seafood consumption around the world is increasing. A large part of this growth can be attributed to the international concern for healtheir foods. Per capita consumption of seafood is increasing in almost every developed country of Europe and North America. Two new developments, aqua-farming and surimi processing are expected to continue in Western Europe and North America.

The per capita seafood consumption in 1986-87 in some leading developed countries are as follows

	Kg
USA	6.7
FRG	13.2
Japan	70.0
UK	20.0
France	20.0
Spain	36.0
Portugal	36.0
Sweden	36.0
Denmark	36.0
Norway	48.0

(Chemical Weekly 34(40), 1989, 81)

247 FAO aid for meat sector

The U.N. Food and Agriculture Organisation (FAO). is to assist India in modernising the meat industry sector and related activities.

An agreement signed on Tuesday provides for a $ 100,000 project, financed by FAO's technical co-operation programme, for this purpose. To be implemented by the agriculture ministry, the project is expected to help boost meat exports, besides improving conditions in the local market.

India ranks first in the world in the population of goats (100 million) and buffaloes (75 million). It is sixth in the case of sheep (50 million). The number of pigs in India is estimated at about 10 million and that of chicken at 180 million.

Assistance from FAO will concentrate on providing the government with a detailed review of the present meat industry and guidance for future policy planning. It will also provide technical knowhow for mechanised and semi-mechanised slaughter houses inclusion of slaughter-house by-products collecting scheme in the mechanisation programme, establishment of wholesale markets and improvement of retail shops and facilities for sanitary control and meat hygiene.
(The Times of India 9 August 1989, 16)

248 Oils and oilseeds situation

The Union government has taken a number of measures for augmenting the production of oilseeds and oils and also to maintain the prices of vanaspati and refined oils at reasonable levels.

As a result of these measures, the production of vanaspati has increased by one lakh tonnes during 1987-88 and there has been an increase of around two lakh tonnes of solvent extracted oils during the last four years.

Some of the important measures taken by the government included: review of the vanaspati licensing policy under which the joint sector has been accorded priority after oilseed growers cooperative societies so as to ensure implementation of the projects by the state governments with reduced financial burden on their resources, according to an official release.

Usage of expeller groundnut, mustard and rapeseed and sesame oil has been allowed in the manufacture of vanaspati to provide remunerative prices to the farmers. Presently, only expeller mustard and rapeseed oil has been allowed to be used in the manufacture of vanaspati to the extent of 20 per cent. This permission is valid upto June 30, 1989. The oil usage policy has been tailored in such a way as to encourage the exploitation of non-traditional and minor oils and also to relieve pressure on indigenous traditional oils used for direct human consumption.

Relaxation in edible oilseeds and edible oils (storage control) order has been given for storage of oilseeds. Directives have been issued to the Reserve Bank of India for increase in the credit limit under the Selective Credit Control scheme. The minimum support prices in respect of certain oilseeds have been fixed so as to ensure a remunerative return to the farmers.

Import of edible oils for allocation to the vanaspati industry has been reduced substantially so as to exploit the indigenous minor and non-traditional oils.

Subsequent upon fixing the minimum economic capacity for the vanaspati industry, about 16 units have expanded their capacity by about one lakh tonnes per annum.

Fiscal incentives in the form of excise rebate on the usage of solvent extracted mustard and rapeseed, sunflower, safflower, mahua, palm and rice bran, in the manufacture of vanaspati were extended which has been resulted in an increase in the production of edible grade rice bran oil and mustard oil considerably, it is claimed.
(The Economic Times 21 June 1989, 3)

249 Programmed potatoes

An American chemical engineer, Michael Kozempel of the US department of agriculture's Eastern Regional Research Centre in Philadelphia, (ERRC) has developed a computer programme to increase efficiency in the food processing industry. The programme, called the ERRC Food Process Stimulator, models the process for making instant mashed potato.

The programme, written in Fortran, runs on a personal computer and consists of the routines for processing the potatoes. It analyses every step in the process - from raw potatoes to cooked stuff and dried flakes - and accounts for variables such as the cost of electricity and labour. What is more, the programme makes corrections for imperfections in the real factory - such unequal mixing of potatoes and water in the blancher.

The aim is to increase efficiency. For example, when potatoes contain relatively large quantities of sugar, they tend to turn too brown when fried. A factory can compensate for this either by blanching the potatoes for longer time or by raising the temperature of the water in the blancher.
(Business World 9(3), 1989, 38)

250 TN govt takes over brewery

The Tamil Nadu government today announced the takeover of a new beer manufacturing unit in the city, reports UNI.

The unit, Emmpee Breweries and Distilleries, owned by the Madras International group of hotels, is the second to be taken over by the state government, following its new policy of taking control of liquor production announced by chief minister M.Karunanidhi in his 1989-90 budget speech.

The first unit to be taken over was the joint sector Southern Agrifurane, subsidiary of the Southern India Petrochemicals (SPIC).

An official release issued here today said the beer unit was given permission last year. However, when the government was approached for commencement of beer production after the unit was set up, the permission was rejected. The newly-formed Tamil Nadu Spirit Corporation (Tasco) has since been given permission to run the Rs. 8.5 crores unit. The Tasco would repay the Rs. six crores loan taken from financial institutions.

The unit, which would soon commence production, would brew 1,20,000 cases of beer every month initially. The capacity would go upto 2,25,000 cases in about six months.

The unit would cover 70 per cent of the beer consumption in the state.

The spirit corporation would also in stages acquire another liquor unit - a cooperative venture located at Villupuram in South Arcot district.

The beer unit, at current prices was estimated to cost Rs. 12 crores.
(The Economic Times 23 August 1989, 1)

251 Ban on beer plants lifted

The recent decision by the Government to lift the ban on the creation of new capacity or expansion of existing capacity of beer which has been in force since November 19, 1975 will definitely give a much desired boost to the beer industry. Till now, fresh licenses were to be issued only in cases where the production was exclusively meant for exports.

Although, some of the Indian brands of beer have found a good market abroad and compare well with the German and Danish products, one major constraint has been the freeze on capacity expansion. The industry having to cater to the expanding domestic market, exports have not been up to the extent possible. On the other hand, the policy of export-oriented units for beer has not found much favour as the viability of units based only on exports was though to be a risky proposition.

As per the recent decision, each beer manufacturing unit will be licensed for a minimum capacity of 5000 kilolitres per annum. The units will have to meet the fund requirements for implementation of the project through their own internal resources without recourse to the Central or State Financial Institutions. MRTP and FERA companies will also be granted new capacities or for substantial expansion of the existing capacities under certain export obligations. The unit will not be allowed in tribal areas.
(Chemical Digest 15(7), 1989, 7)

252 Soyabean lab at Indore

The Indian Council for Agriculture Research (ICAR) has provided Rs.2.50 crores for construction of a modern laboratory at the National Research Centre for soyabean here. The Director of the Centre, Dr.P.S.Bhatnagar, told that the laboratory would be completed within two years. The Centre would have an exhibition hall for farmers, lecture halls, a research laboratory and library. He said the centre had been working to develop varieties of soyabean suitable to Indian conditions to enhance yield per hectare.
(Financial Express 18 August 1989, 4)

FOOD REGULATION, QUALITY CONTROL AND HYGIENE

253 Sugar (Control) Order 1966 (Amendment)

G.S.R. 1193(E) Ess.Com./Sugar - In exercise of the powers conferred by clause 5 of the Sugar (Control) Order, 1966, and in supersession of the Order of the Government of India in the Ministry of Food and Civil Supplies (Department of Food) No.G.S.R. 391 (E) Ess. Com./Sugar, dated the 22nd May, 1984 the Central Government hereby directs that no recognised dealer shall hold any stock of vacuum pan sugar or khandsari (open pan sugar) for a period exceeding seven days from the date of receipt by him of such stock and shall not keep in stock at any time -

(1) vacuum pan sugar, in the places mentioned below, in excess of the quantities mentioned against each,

(i) in Calcutta and extended area -

(a) recognised dealers who import sugar from outside West Bengal - 3,500 quintals;

(b) other recognised dealers - 500 quintals;

(ii) in other places -

(a) in cities and towns with a population of one lakh or more - 500 quintals;

(b) in other towns and areas with a population of less than one lakh - 250 quintals.

(2) Khandsari (open pan sugar) in excess of 500 quintals.

Provided that nothing in this Order shall apply to the holding or keeping of stock of sugar or khandsari -

(i) on Government account; or
(ii) by the recognised dealers nominated by a State Government or an officer authorised by it to hold stock for distribution through fair price shops; or
(iii) by the Food Corporation of India.

EXPLANATION - For the purpose of this Order -

1. "Calcutta and extended area" means the areas specified in the Schedule to the notification of the Government of West Bengal No.; 7752 FS/F.S./14 R 92/61, dated the 16th December, 1964.

2. for counting the period of holding of the stock, the date on which any stock is received by the recognised dealer shall be included.

(The Gazette of India Part II - Section 3 - Sub-section (i) No.660, 21 December 1988)

254 Rice Milling Industry (Regulations and Licensing) Second Amendment Rules, 1959

G.S.R. 1210 (E) - Whereas the draft of certain rules further to amend the Rice Milling Industry (Regulation and Licensing) Rules, 1959 was published as required by sub-section (1) of Section 22 of the Rice Milling Industry (Regulation) Act, 1958 (21 of 1958) in the Gazette of India Part II, Section 3, Sub-section (i) dated the 8th October, 1988, under the notification of the Government of India in the Ministry of Food Processing Industries No.GSR 802 dated 1-10-88, inviting objections or suggestions from all persons likely to be affected thereby before the expiry of a period of forty-five days from the date on which the copies of the official Gazette in which the said notification was published were made available to the public;

And Whereas the said Gazette was made available to the public on the 10th October, 1988;

And Whereas the objections and suggestions received from the public on the draft have been cosidered by the Central Government;

Now, therefore, in exercise of the powers conferred by Section 22 of the said Act, the Central Government hereby makes the following rules further to amend the Rice Milling Industry (Regulation and Licensing) Rules, 1959, namely:-

1. (1) These rules may be called the Rice Milling Industry (Regulation and Licensing) Second Amendment Rules, 1988.

(2) They shall come into force on the date of their publication in the Official Gazette.

2. In the Rice Milling Industry (Regulation and Licensing) Rules, 1959 (i) in sub-rule (3) of rule 4, for the letters and figures "Rs. 20/-" and "Rs. 10/-", the letters and figures "Rs. 200/-" and "Rs. 100/-" respectively shall be substituted : (ii) in rule 5, for the letters and figures "Rs. 30/-", the letters and figures "Rs. 200/- " shall be substituted.
(The Gazette of India Part II - Section 3 sub-section (i) No.672, 27 December 1988)

255 Vegetable Oil Products (Standard of Quality) Amendment Order 1988

G.S.R. 1068(E):- In exercise of the powers conferred by sub-clause (1) of clause 4 of the Vegetable Oil Products Control Order, 1947, the Vegetable oil Products Controller for India hereby makes the following Order, further to amend the Vegetable Oil Products (Standards of Quality) Order, 1975, namely:-

1.(1) This Order may be called the Vegetable Oil Products (Standard or Quality) (Amendment) Order, 1988.
(2) It shall come into force on the date of its publication in the Official Gazette.

2. In the First Schedule to the Vegetable Oil Products (Standard of Quality) Order, 1975, for sub-clause (a) of clause (1) of paragraph 2, the following shall be substituted, namely:-

(1) "(a) It shall be prepared by hydrogenation of one or more of the following vegetable oils, namely:-

(i) Cottonseed oil.
(ii) Solvent Extracted Groundnut oil.
(iii) Mahua Oil.
(iv) Maize (corn) oil.

(v) Nigerseed Oil.
(vi) Palm Oil.
(vii) Rapeseed Oil.
(viii) Ricebran Oil.
(ix) Soyabean Oil.
(x) Sunflower Oil.
(xi) Watermelon seed Oil.
(xii) Palmolein.
(xiii) Salseed Oil not exceeding 10 per cent.
(xiv) Solvent Extracted Rapeseed/Mustard Oil.
(xv) Safflower (Kardi seed) Oil.
(xvi) Solvent Extracted Sesame Oil.

Explanation:

In this Order, 'Rapeseed Oil' shall mean only imported rapeseed oil".
(The Gazette of India Part II - Section 3. sub-section (i) No.584, 12 November 1988)

256 Ban on mineral oils in foods

Mineral hydrocarbons to be banned from use on food or food processing in the UK, as soon as possible. This follows after the studies by Shell Research that oils made by conventional and hydrogenation process are toxic down to very low doses.

The ban will apply to mineral oils used on dried fruit to keep them from sticking, on citrus fruits to replace the natural wax coating lost in washing and on the rind of some cheeses. It will also prohibit the use of such oils in processing of foods, such as confectionery, jellies, bread and sausages.

Furthermore, the Shell animal experiments have shown that mineral oils produced either conventionally or by hydrogenation are toxic down to very low levels. No acceptable daily intake (ADI) could be estimated by the UK Committee of Toxicity (COT).

While there is no evidence that mineral oils have had harmful effects in humans, the COT is worried by the fact that they accumulate in the lymph nodes, liver, spleen, and fatty issue of humans, which are the same organs that the oils damage in animals. The Ministry of Agriculture, Fisheries and Food will shortly issue proposed regulations to ban them in food.
(Chemical Weekly 34(44), 1989, 81)

257 No pesticide residues in Indian apples

Studies on pesticide residues conducted over the last 10-15 years by the Indian Council of Agricultural Research have revealed that in a majority of samples, residue levels were below the prescribed limits. This was stated in the Lok Sabha by the Minister of State for Health and Family Welfare, Ms. Saroj Khaparde while replying to a question raised in the lower house. The question was prompted by recent reports of contamination of apples in the U.S. and Chile.

Replying to yet another question the minister stated that in a survey conducted by the Directorate General of Health Services during the year 1987, a total of 648 samples of various commodities of food collected from the farmers and markets were analysed mainly for DDT and BHC. The results are shown below :

Statement showing name of each commodity, number of samples analysed and number of samples exceeding prescribed limit.

Commodity (Name)	Number of samples analysed	Number of samples exceeding prescribed limit
Vegetable	231	1
Fruits	181	1
Cereals	74	6*
Pulses	103	2*
Vegetable oils	52	-
Dairy product	7	6
Total	648	16

* 33 samples of cereals and 31 samples of pulses also showed presence of DDT for which no tolerance limit has been prescribed. However, the level was below the detectable level in most of the rice and wheat flour samples.

(Chemical Weekly 34(48), 1989, 52)

258 Monitoring of radioactivity level in Indian marine products

The radioactivity analysis on the frozen shrimp samples conducted by the Bhabha Atomic Research Centre, Bombay revealed very low levels of radionuclides. The gamma spectrometric analysis showed that the only detected radionuclide is Cs 137 in the level of 18 Bacquerel/kg which is rather negligible when compared to the derived limit of 40 Bq/Kg Cs 137 in the food material.

(Seafood Export Journal 21(4), 1989, 25)

259 Standardisation of steel utensils

The Indian Nickel Development Institute has suggested introduction of a national certification mark for stainless steel being used in domestic appliances.

National certification and customer education will help push sub-standard steel out of the market, the Institute Director, Mr.V.R. Subramanian, said in a statement.

A customer, guided by the certification mark and informative labelling, could make his choice of the stainless steel for his use.

The Institute has stressed the need for vigorous efforts to check and punish malpractices in pushing sub-standard stainless steel.

Mr.Subramanian said the Government should consider certification marking for stainless steels used in household utensils and kitchenware almost with the same seriousness as in certification of medicine and drugs.

Referring to recent press reports about influx of sub-standard, stainless steel in the market, Mr.Subramanian said there were utensils with nickel polish over mild steel, selling as cheap and affordable stainless steel items.

"Such malpractices should be condemned and serious action is warranted against such parties", he said.

Mr. Subramanian, however, took objection to efforts to decry the 200 series stainless steels as unsuitable and inferior for utensils.

He said although stainless steels of 301 and 304 grades were the most preferred materials for utensils as they had 18 per cent chromium and eight per cent nickel, the 200 series were well established and in use all over the world.
(Financial Express, 20 June 1989, 3)

260 Delhi extends ban on milk food manufacture

The Delhi administration extended the ban on the manufacture of milk food till the middle of next month.

The Executive Councillor (Health and Food and Civil Supplies), Mr. Bansi Lal Chauhan, issued the Delhi (Manufacture of Milk Food and Exports) Control Order No.two extending the ban up to August 15.

The ban will be applicable to all industrial undertakings manufacturing milk food like milk powder (whole/skimmed), condensed milk, cheese (processed) and desi ghee.

According to the order, the manufacture and export of milk food by industrial undertakings has been prohibited. Earlier, the ban was imposed on June 12 and remained in force till July 15.
(Financial Express 27 July 1989, 6)

261 Eggs have less cholesterol

Eggs have 22 per cent less cholesterol than previously believed, according to a new government study in U.S.A.

The one year study by the US Department of Agriculture in conjunction with the Washington based Egg Nutrition Centre, was a welcome news to the US egg industry, which has seen declining profit in recent years partly because of health concerns.

The average large egg was found to contain about 213 milligrams of dietary cholesterol. That was significantly less than the 274 milligrams reported in government guidelines since 1976.

The fat content of the eggs was also slightly lower than previously reported, with an average of five grams total fat per large egg.

The revision is due to better testing methods and different feed, husbandry and breeding practices; according to Gary Beecher, chief of the USA's nutrition information service.

The study examined nearly 2500 eggs from producers around the United States.
(Poultry Guide 26(6), 1989, 96)

262 Pan masala is genotoxic

Cancer researchers in Ahmedabad have confirmed that pan masala is "genotoxic" and have sounded a warning on its indiscriminate consumption. A substance is said to be genotoxic if it damages the cell's chromosomes containing hereditary material called genes that are passed on by parents to children.

Dr.S.G.Adhvaryu and co-workers at the Cell Biology Division of the Gujarat Cancer Research Institute have found pan masala to be genotoxic even at levels much lower than average daily consumption by a pan masala addict. The scientists said they used a popular brand of pan masala for their study.

The extract of pan masala was mixed with a testube culture containing the growing ovarian cells of a Chinese hamster.

The scientists said that they observed chromosomal changes in hamster cells treated with extract from as little as 1.1 milligrams (mg) of pan masala.

The small pouch of pan masala sold in the market contains about 5000 milligrams, and the average daily human consumption is 6000 mg to 8000 mg, the scientists said.

The researchers warned that the chromosomal damage was dose dependent and therefore the "end effects would be the result of cumulative effect of pan masala consumed".

They said though their report was preliminary, the results " do warrant a restriction to the indiscriminate use and sale" of pan masala until further indepth studies are completed.

While tobacco chewers spit out the juice, pan masala is consumed in full. Therefore, in addition to local effects on oral mucosa, pan masala is likely to produce systemic effects as well, the scientists cautioned.
(P.T.I. Science Service 8(9), 1989, 1-2)

263 Peptide prevents tooth decay

Scientists at the Department of Preventive and Community Dentistry, Melbourne, have discovered a milk component that prevents tooth decay. The natural product has potential as an additive that could 'decay-proof' any food or drink. It can also repair minor tooth-decay damage. The team discovered why some foods heavy in sugar, e.g. milk chocolate, do not cause as much tooth decay as most sugar-rich products.

Tests showed that the active anti-decay substance formed part of casein, a protein which comprises about 3% of liquid milk. Confectionery manufacturers were persuaded to make a special chocolate in which non-fat milk solids were replaced by commercially available sodium caseinate, producing a three-fold increase in casein level (to 18%) without altering sugar or fat levels. The chocolate caused no decay at all, although the first blends had a noticeable after taste.

The group then isolated 21 peptides found in casein and discovered one which bound calcium and phosphate, preventing tooth decay caused when these substances are leached out of teeth by plaque acids formed by fermenting sugar, it bound strongly to teeth; and it repaired minor tooth damage by replacing calcium and phosphate.

It was then shown that the white, tasteless peptide could be readily extracted from casein and was effective and undetectable at concentrations of about 2%.
(Journal of Scientific and Ind. Research 48(2), 1989, 118)

TRANSFER OF TECHNOLOGY AND NEW INDUSTRIES

264 New soft drink from HPMC

The Himachal Pradesh Marketing Co-operative (HPMC), has introduced a new soft drink, Apple-Tapple, apple juice concentrate in paper packs. The drink has been marketed on trial basis in four Southern states, the Himachal Chief Minister told newsmen here on Wednesday. It will be introduced in other states shortly he said.
(Financial Express 19 August 1989, 4)

265 All Seasons Foods' new plant

All Season Foods' new plant at Nasik is expected to launch production soon. The plant will be making not only ready-to-eat meals but also many new products such as baby foods, milk and malt-based products and energy-based products etc. The company's current year target is to achieve a turnover of Rs. 100 crore. During 1988, its sales have increased to touch Rs. 25.76 crore.
(Chemical Products Finder 8(2), 1989, 109)

266 Sakthi Soyas' Project

Sakthi Soyas is launching an integrated soyabean processing project in the joint sector with Tamil Nadu Industrial Development Corporation (TIDCO). The company has a technical collaboration agreement with Buhlers of Switzerland and Extraction Techniques of West Germany. The project, coming up near Coimbatore in Tamil Nadu, is poised to go on stream. The project, which will have a capacity of 90,000 tonnes per annum, will produce edible refined soya oil, defatted soya meal and edible soya flour.
(Chemical Products Finder 8(2), 1989, 109)

267 Nestle pioneers palm - fat based milk

Nestle Malaysia Sdn., Bhd. has manufactured the first milk powder which contains palm-fat instead of butter fat in their full cream brands in Malaysia. The product is called Carnation Instant, Filled Milk Powder which is packed in 400 gm. boxes and 1 kg tins.

The milk powder is made from non-fat milk solids and refined palm oil. It contains milk protein, palm fat and milk sugar equivalent to the amount of protein, in fresh dairy milk. It also contains calcium, Vit. A and D.

The milk powder is manufactured by Nestle at its milk spray drying plant in Selangor Darul Ehsan and is said to be the first of its kind based on palm-fat.
(Chemical Weekly 34(48), 1989, 83)

268 Lipton India diversifies

Lipton India has diversifed into the food and beverages market with a range of fruit-based drinks and biscuits. In fact, the company's range of fruit-based beverages under the banner Tree Top in tetra-brick pack enjoy a strong presence in the market. Lipton also completed test marketing of its range of biscuits successfully and it has planned to extend their distribution to all potential markets. Besides the animal feeds business, dairy products business had another good year in 1988. Anikspray, skimmed milk powder, increased its market share with good distribution and marketing support.

Domestic sales of Lipton Tea brands made satisfactory progress. The company launched Taaza, a new blend of tea in pouch packaging, which has met with encouraging response.
(Chemical Products Finder 8(1), 1989, 100)

269 Brooke Bond widens product range

Brooke Bond India Ltd has widened its band of consumer products with the launch of six new blends of spices mixes, which are packed in specially developed polylaminated packs to ensure the long-term freshness. The company had entered the spices market way back in 1971 by creating an export market for these items. The spice mixes were launched in 1982 in four towns initially. Now they are available in all parts of the country.
(Chemical Products Finder 8(1), 1989, 107)

PERSONALIA

270 K.M.Chandrasekhar

Mr.K.M.Chandrasekhar, Chairman of the Spices Board, has assumed additional charge as Chairman of the Marine Products Export Development Authority (MPEDA).

This follows completion of the five-year term of Mr.T.K.A. Nair as Chairman of MPEDA.
(Financial Express 10 June 1989, 6)

SPECIAL ARTICLE

Packaging

Some Developments in the Technology, Materials and Applications

Packaging does more than simply extend the shelf-life of food-stuffs and other consumer items or protect them from adulteration: they also need to be well presented for retail selling; and ready-to-use food-stuffs must be packaged to perform both under freezer and oven temperatures. For countries aiming to develop export markets in particular, the use of modern packaging is, therefore, essential. Packaging to international standards requires advanced materials, manufacturing, processing and printing technologies.

RISING living standards and greater emphasis on production of food and other consumer items for export place an immediate demand on more widespread use of packaging. Packaging does more than simply extend the shelf-life of foodstuffs and other consumables or protect them against adulteration: they also need to be well presented for retail selling; and ready-to-use food-stuffs must be packaged to perform under freezer temperatures as well as in conventional oven environments. For countries aiming to develop export markets in particular, the use of modern packaging is essential to ensure foodstuffs are supplied to internationally accepted standards.

The traditional tin plate containers are constantly undergoing technical innovations. The trends in the manufacture of tin cans for drinks and preserved food, are in the direction of weight reduction (through continuous casting and hot/cold rolling methods), more versatility (such as rectangular shapes with round lid and base), more ease of use (for instance, air-relief valves can be built into coffee containers to permit gases to escape), and systems ecologically more relevant (press-in lids for cans for easier recovery from disposal sites with magnets).

On the growing market of ready-to-use products, glass plays an increasingly important role. Modern technologies in the glass-container industry are being consistently improved. The trends are mainly in the direction of light-weight glass and individual design. One of the new uses of glass is as a package that can go into the microwave oven. This allows food to be heated economically and efficiently.

World-wide, aluminium packaging has seen its share of innovations. For example, collapsible tubes of aluminium-plastic laminates have found widespread use for fluoridated toothpastes. Flat aluminium light-weight containers offer shorter sterilisation times, which can improve pharmaceutical product quality. Ready-to-use packages can be heated up in microwave ovens after removal of the lid, with or without spatter-proof cover. As a means of packaging drugs, aluminium is used with increasing frequency alone or in combination with materials contributing tensile strength for push-through and tear packages. Such packages offer protection against moisture and light. In cans for beverages, aluminium is becoming ever more prevalent due to significant advances in impermeability to gases and liquids, opening convenience, possibility of hot and aseptic filling, and ecological positioning. By reducing wall thickness and scrap reduction the required gross amount of material has been reduced to half. Packages with a high aluminium percentage can be recycled. This saves upto 95 per cent of the energy required for the production of the raw material.

Today, there is a wide range of packaging systems available for aseptic filling, such as carton pack; aluminium and plastic laminates; bags of various sizes, starting with sachets to large-size bags in cartons; cases and casks; plastic cups and tubes; cans of tin and combination cans; bottles of glass and plastic; drums; and stationary and mobile storage tanks. Modern heat-sealed packages, which contain aluminium foils, can obtain impermeability values and shelf-life periods equal to conventional rigid-walled containers. Plastic multiple-layer containers are about to make their entry into this field as well.

THE TRADITIONAL METAL CANS

In spite of the development of newer packaging materials, tinplate and its derivatives dominate the food packaging field. The traditional metal can called the open top sanitary (OTS) can, is a rigid container normally made of tinplate. It can be hermetically sealed for packing various food products and is mainly used for thermally processed foods. The container not only withstands the temperature and internal pressure during processing but also prevents entry of microorganisms.

The manufacture of tinplate and the techniques of can-making have evolved together over the last 150 years to compete economically and aesthetically with other packs so that the tinplate of today is a material different from that originally used at the beginning of the last century. The change from 'hot dipping' the sheets of base plate steel in tinning bath, where it was impossible to control the amount of tin to be deposited on the steel at levels below 11.2 g/m² of tincoating on each side of the plate, to electrolytic tinning in coil or sheet form has made the production of tinplate more economical. The development of differential electrolytic tincoating has resulted in further economies.

New Materials

New materials have been developed for use in OTS cans. Tin-free steel (TFS) developed in Japan, for example, has a steel base with a chromium/chromium oxide surface replacing the tin in conventional tinplate. This new surface provides an excellent substrate for lacquer adhesion which ensures superior performance in terms of product compatibility for many food products. Another new material Litewel-N (LTW-N), is being marketed by a Japanese company for use in welded food-and-beverage cans. Consisting of a steel sheet thinly plated with tin and tin-nickel alloy, LTW-N is calimed to have corrosion resistance, weldability and lacquer adhesion properties comparable to tinplate despite containing less tin.

Aluminium is a material which can only be used for drawn can manufactured by deep-drawing process as opposed to side seam soldered/welded can normally made of tinplate. There are two methods by which drawn containers can be manufactured: (a) draw and re-draw process (DRD), and (b) draw and wall ironing process (DWI). In Europe and the USA, aluminium has found its use mostly in the field of beverage processing industry. The metal has been found to be very prone to corrosion, and because of limitations in terms of can diameters and heights, it is not favoured as a potential replacement for tinplate.

A metal container requires an internal protective finish for certain food products to prevent interaction between the product and the metal. In addition, it needs protection from the environment, that is, severity of climatic conditions, transport abuses and rough handling. To meet these requirements, organic coating materials are applied both for protection and decoration to the metal containers. Significant developments have taken place during the last decade in respect of various lacquer systems suitable for packing different food products, mainly those requiring thermal processing.

Advantages of OTS Cans

The main advantages of the OTS cans are their functionality, convenience, tamper-proofness and get-up. The OTS can made from tinplate protects the food from physical damage, specially from rough handling and transportation. The metal cans also give longer shelf-life to the packed food items and prevent adulteration. In addition, metal cans can be printed externally in multicolour at little extra cost. Cans have also about four times more shelf-life (12 months) than pouches and Tetrapacks and need no preservatives.

OTS cans are also recyclable. Some 4.2 million used tinplate cans are separated magnetically and recycled in USA and Canada each year. Once shredded, the can scrap is returned for steelmaking. Over half-a-million tonne of high value scrap has already been used in this way, and the American Iron & Steel Institute indicates that tinplate recycling will be increased with magnetic separation facilities incorporated in almost all new recovery plants.

THE UBIQUITOUS POLYMER PACKS

The place of traditional packaging materials like wood, paper, jute and metal is being taken over by various plastics which require comparatively less energy for production and conversion. This change has been more prominent during the last two decades. These include large tonnage plastics called commodity plastics like, polystyrene (PS), low density polyethylene (LDPE), high density polyethylene (HDPE), polypropylene (PP) and polyvinyl chloride (PVC) and production of linear low density polyethylene (LLDPE). Other plastics which are also gaining importance in the packaging field because of certain unique properties they possess are nylon, ionomer and ethylene vinyl acetate (EVA). The three modes of plastic packaging are rigid containers, flexible packs and fabric packs. Their common applications are many.

Rigid Containers

Self-supporting rigid plastic containers, ranging from a few millilitres to fuel oil tanks with capacity as large as 10,000 litres, are blow-moulded. The common applications of rigid plastic containers are cosmetics, pharmaceuticals, soft drinks, edible oils, pesticides, detergents and paints. When the containers are injection-moulded, the materials used are polystyrene (PS), high density polystyrene (HIPS) and polypropylene (PP). For blow-moulding, the materials used are rigid PVC or the popular HDPE.

Pharmaceutical containers are both injection- and blow-moulded. The most common material is HDPE but for ointments and inhalers, the material used is PP. For aerated beverages, the containers used are made from polyethylene terephthalate (PET) because of transparency and better barrier properties. HDPE and

PP could also be used for non-aerated applications. Thin-walled containers injection-moulded from HDPE/PP and also vacuum/thermo-formed containers from HIPS are used for packaging products like yoghurt. Containers blow-moulded from high molecular (HM) HDPE are generally used for textile auxiliaries, pesticides, oils, paints and chemicals. For paints, sometimes injection-moulded pails from HDPE are also being used. HDPE is the most widely used material for containers for edible oils, custard powder and drinking chocolates. These are generally blow-moulded. However, PET bottles are slowly gaining popularity for packing of edible oils.

Flexible Packs

Of late, flexible packaging has been gaining a lot of importance as compared to blow-moulded containers of similar size, primarily because of weight reduction and improved barrier properties which result from the use of different polymers in a multi-layer laminate. Even a two-layer film produced from one polymer will give better results over a single layer film of the same thickness from the same polymer as a result of overcoming pinhole effect. Such films are produced by co-extrusion technique. The polymers commonly used are LDPE, HDPE, PP, EVA, ionomer and nylon 6. The advantages of different polymers are given in Table 1. A number of combinations of these polymers used for different end applications are given in Table 2.

Fabric Packs

Fabric made from weaving of monoaxially oriented tapes of HDPE/PP is finding increased use, *vis-a-vis* jute, in a number of industries. This is primarily because of the superior chemical resistance and good strength of such fabrics. Fabric made from PP is commonly used the world over. HDPE fabric is also popular in some parts. For instance, HDPE woven sacks are being used in packing a variety of products, such as fertilizers, foodgrains, pesticides, cement, wheat, flour, milk powder and sugar.

Besides packing of numerous consumer products, plastics are also used in the following areas:

- ☐ Stretch wrapping;
- ☐ Shrink-wrapping to produce unitized packing;
- ☐ Blister packing and strip packing of pharmaceutical products; and
- ☐ Heavy duty LDPE/LLDPE bags for packaging various products.

In addition to the above, plastics are also used as composites in combination with aluminium foil, paper, board, etc. for packaging various products like pharmaceuticals and detergents.

Advantages of Polymer Packs

The present trend in packaging is towards a changeover to plastics from the traditional packaging materials. Among plastics also, flexible packs (up to 1 litre size) have an edge over rigid containers. The reason is that they are lighter and economical. Besides being functional in protecting the contents of a container from moisture, oxygen and loss of aroma, plastic packages can be easily and attractively decorated by multicolour printing. However, in the selection of plastic materials, complete compatibility studies have to be undertaken to ensure the expected shelf-life of the product as well as safety to the consumer.

TABLE 1

ADVANTAGES OF DIFFERENT POLYMERS

Polymer	Advantage
LDPE	Good clarity
(HM) HDPE	Moisture- and oil-barrier property
PP	Toughness, rigidity and resistance to high temperature
Ionomer	Good sealability at low temperature, resistance to oil, puncture resistance
EVA	Good impact property and good sealability
Nylon 6	Gas barrier property, aroma retention

TABLE 2

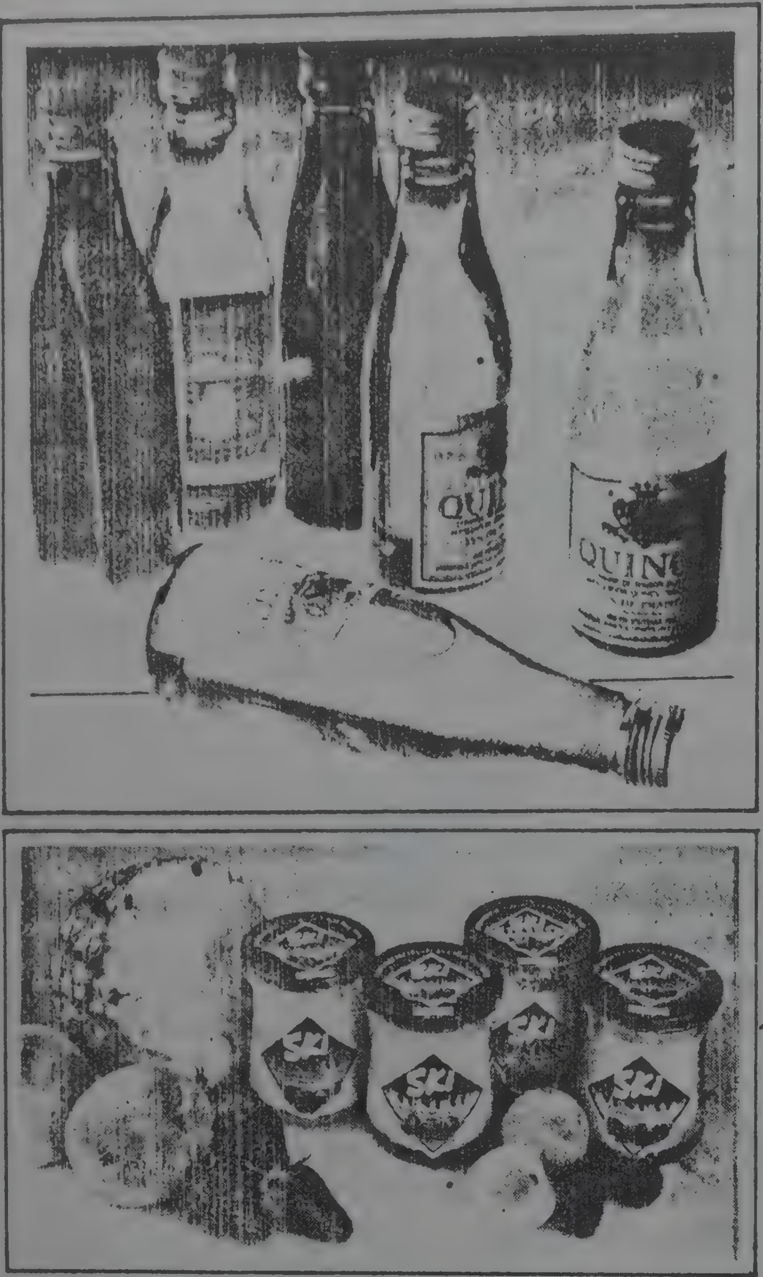
APPLICATIONS OF DIFFERENT POLYMER COMBINATIONS FOR FLEXIBLE PACKS

Combination	Application
LDPE/LDPE	Milk Products
HDPE/LDPE	Dried foodstuffs
LDPE/HDPE/LDPE	Edible oils and snacks
Nylon 6/EVA	Spices, coffee, etc.
Nylon 6/Ionomer	Edible oils
PP/EVA	Cheese and bread wrapping
Nylon 6/LDPE	Roasted coffee
LDPE/PP/LDPE	Bread, biscuit
HDPE/EVA	Snack foods and cereals

Considerable research is being carried out, particularly in the West, in plastics recycling. Processes and equipments have been developed for this purpose. Research and development in the area of totally biodegradable plastics (or 'natural' polymers) is also making good progress. One example is the polymer material called PHB (Polyhydroxy-butyrate) being developed in the UK. (For more on plastics recycling, please see 'The Versatile Plastics: Technology, Development, Application and Waste Recycling', *Tech-Monitor*, January-February 1989).

THE VERSATILE PET

Polyethylene terephthalate, known widely as 'PET', makes a versatile packaging material. PET first made massive inroads into the beverage packaging market, then the food market, the toiletry and cosmetics and



PET bottles for packaging a range of spirits (top) *and PET yoghurt pots* (bottom)

even the agrochemical areas. There are many reasons for its success: it is tough, has a clean bright appearance, can be made stable over a wide range of temperatures, light yet provides a good barrier to many gases, and, above all, is suitable for use with a wide range of foodstuffs and beverages.

PET has quite a high value as a recyclable material. It can be ground down and used for many things from insulation to strapping material. A company in the Netherlands, for instance, has not only been very successful in the manufacture of PET pre-forms and complete bottles for the home and export markets, but has been one of the first to get an actual recycling scheme going. The intention of the company is to actually produce new bottles. Initially they have been grinding up the material and producing base caps, so eliminating the requirement to remove base caps when their own bottles are returned. As more of their own bottles are returned, or more bottlers adopt free standing PET bottles without base caps, it should be possible for this company to use the returned material for manufacturing new bottles.

However, compared to most packaging materials PET is expensive. Yet, PET usage has increased at a rate which has astounded a great many people, and today manufacturers are constantly revising forecasts for world PET usage, always upwards. Substitution of traditional packaging materials by PET is happening right across the food and beverage range, and the possibilities for PET seem boundless. In many cases manufacturers are ignoring the price disadvantage to make a switch to PET, because the material offers them so much in other ways. It is an exciting material holding a great many possibilities for the packaging market since it is so versatile. While it is best known in its stretch/blown form, the technique used to produce carbonated drink bottles, PET can also be injection-moulded, blow-moulded, extruded and thermoformed.

THE DUAL-OVENABLE PLASTIC PACKAGES

Plastics entered the dual-ovenable packaging scene with the concurrent development of microwave ovens (requiring non-metallic heat-in packages), and the hotter conventional convection and infrared oven equipment. The challenge for dual-ovenable packages is that they must perform under freezer temperatures as well as in conventional-oven environments of 204°C or more.

Trays made of temperature-resistant plastics, such as thermoset polyesters and CPET (crystallizable polyethylene terephthalate), have more than met the challenge. Some of the major CPET resin manufacturers are working to increase the high temperature stability of CPET. The goal is a 260°C use-environment tolerance, up from the current 204°C to 232°C maximum. The higher heat resistance is designed as insu-

Thermoformed CPET food trays

rance that the CPET tray will remain rigid and not break down in high-temperature conventional ovens, where the package can get hotter than the food. Even though the plastic trays are more costly than the aluminium or coated paper versions, companies using them say there is a definite consumer preference for plastics.

MODIFIED ATMOSPHERE PACKAGING (MAP)

The shelf-life of foodstuffs is limited by spoilage arising from microbial growth, enzyme activity, oxidation, senescence and staling. The use of gases, other than normal air, to surround the food may retard some of these deteriorative mechanisms. The use of controlled bulk-storage atmospheres is well known for the delaying of senescence and extending storage life of fresh respiring fruits and vegetables.

HOME-BAKE
Four Seasons
Luxury Pizza
Pizza Royale
Beuberle

Flash-metallized film/board laminates (far left) cause intense heat in microwave ovens, crispen bakery products and PET films coated with PVC barrier layer (near left) have high transparency, bond strength, printability.

Significant advances have been made in the application of modified atmospheres, where the gas mixture is controlled (Oxygen, Carbon-di-oxide and Nitrogen in various percentages) only at the point of packaging. MAP has led to the development of high-performance barrier films. Fresh meat accounts for over half of MAP film packaging. Meat packed in this way has a long shelf-life, and it retains the natural colour. One disadvantage of the system is that the packs are too bulky. That's because there has to be a space between the meat and the pack: if the meat touches the sealing film, it loses its colour. Some retailers are looking for a skin pack with a 6- to 8-day shelf-life, and with a very high oxygen permeability, to retain the natural colour of the meat. MAP is also bringing fresh fish into super markets, without the need for a special counter, and without the problem of smell spreading through the store. It is also being applied to vegetables; special systems have selective permeability that allows the vegetables to respire.

Advances in the use of aluminium are continuing, particularly in vacuum-metallized plastics film constructions. These films have advantages in barrier properties, in aesthetics, and in microwave absorption properties. Flash metallized films, with very thin layers of aluminium, can have positive advantages in microwave cooking. Receptor boards are polyester films, coated with a 0.003-micron layer of aluminium, and laminated to paper or board. Placed under or over the food in the oven, they generate intense heat sufficient to crispen the product. The aluminium coating is sufficiently thin to prevent arcing. French fries, pizzas, and bakery products are prime target areas.

CONTROLLED ATMOSPHERE PACKAGING (CAP)

CAP keeps foods naturally fresh instead of protecting them with barriers. The advent of "smart" selectively permeable CAP film packaging systems has begun to expand the concept into broad food areas. Red meats, coffee, grated cheese, and salad vegetables are the first to use packages designed with CAP-specific materials in order to extend product shelf-life. These more-efficient new CAP materials are the forerunners of a host of structures being developed worldwide. Because they are tailored for CAP, they overcome the drawbacks of applying film and sheet developed for other packaging markets in CAP applications.

Until now, most commercial CAP packaging used standard oxygen-barrier film and sheet. CAP-packaged red meat, baked food, and fresh pasta products, for example, currently are wrapped in PVDC-or EVOH-based barrier films. The drawback of barrier films in CAP is limited shelf-life; most foods continue to "breathe" after being packaged, unfavourably altering the balance of CAP gases that have been specifically combined to preserve them. However, CAP-specific materials exchange gases to maintain that balance from the atmosphere (Figure 1). The result: dramatic gains in shelf-life.

CONCLUSION

Packaging to international standards requires advanced materials, manufacturing, processing and printing technologies. Many Asian countries, therefore, meet their packaging needs through imports. While large foreign joint venture companies have in-house facilities to produce standard packaging requirements, local companies often rely on packaging manufacturers to supply their materials.

The rising number of Asians living and working outside the region since the early 1970's has encouraged a growing market for Asian food in Europe and the Middle East. Food processing companies in some newly industrialized countries have built up sizeable export industries supplying this expatriate market. Since their food manufacturers buy in all their packaging require-

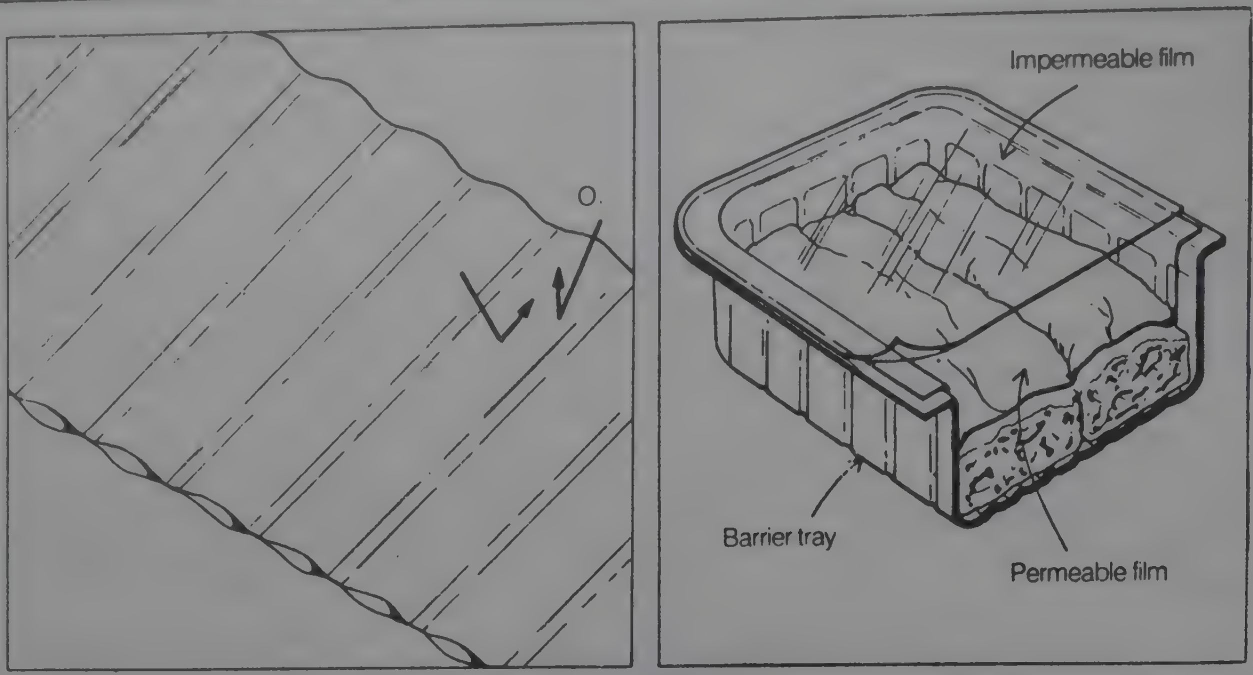


FIG. 1.: *CAP: The film systems* (far left) *passes CO_2 generated by foods through the inner HDPE film into the exchange chambers formed by strip lamination. The outer polyester film prevents excess oxygen from reaching the contents. The CAP system* (near left) *for red meats is a tray over-lidded with PVDC-based barrier film. When the outer film is removed by the retailer for refrigeration, the meat recovers its red colour through the oxygen-permeable inner polyethylene shrink wrap.*

ments, local packaging suppliers have seen their sales volumes increase in line with their countries' growing food export levels. What is more, the printing companies in these countries have modernised faster than those in many other Asian countries, and leading packaging companies there have been quick to develop the even larger food packaging market potential offered by other countries in the region.

The packaging scenario is different elsewhere in the region. Even in countries with a sizeable number of their own packaging companies, they are finding it difficult to meet internationally accepted packaging standards and substitute imports. The reasons are obvious: the materials used are often not of superior quality and the technologies not quite up-to-date. The packaging companies in the region are, therefore, under increasing pressure to upgrade the quality of their products. The challenge could be met only through appropriate research, development and technology transfer. □

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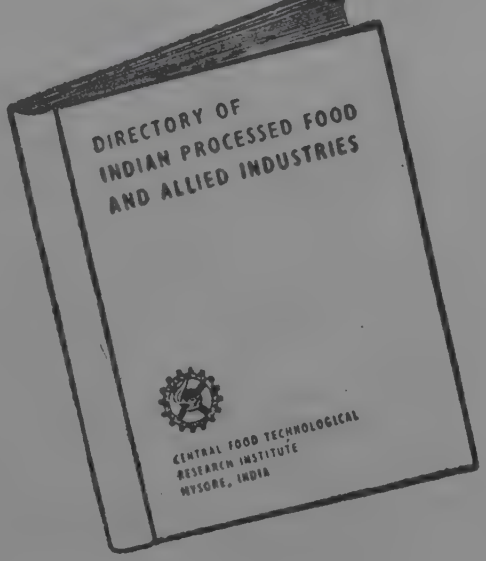

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RAW MATERIALS

271 Amaranth as a potential food grain

The leaves of amaranth are an excellent source of carotenes and they have higher protein content than cereal grains. From nutritional point of view also amaranth contains more protein and fats than cereals. The high protein quality in amaranth is due to its higher lysine (an amino acid) content. Processing techniques, such as flaking, light roasting, popping, wet cooking and extrusion, increase protein quality of amaranth grain. The whole grain as a food source merits greater attention, particularly as a weaning food, because of its excellent protein quality and relatively high energy content. Although digestibility of amaranth oil is lower than cotton seed oil, it is not toxic. Thermal processing of the liquid free amaranth has shown significant improvement in animal feeds.

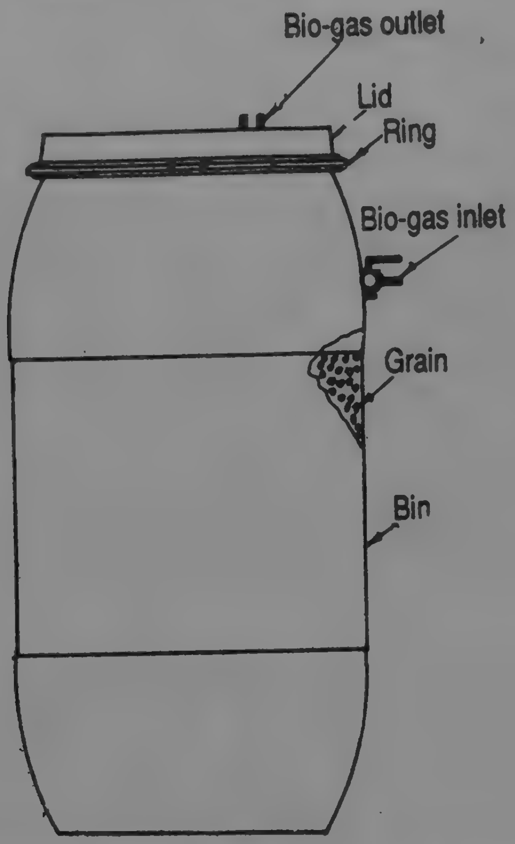
Amaranth can be used alone or in mixtures. When alone, after cleaning, dry grain can be processed to be popped or expanded and if wetted to form flakes. Dry grain can also be extruded alone or mixed with other products such as soyabeans, to give extruded flours. Grains when subjected to starch hydrolysis give a soluble product which is ideal for feeding children.

In mixtures, processed flour can be used as such or mixed with other nutrient sources such as maize, rice or wheat. Complimentary effect of protein was observed when mixed with maize. Amaranth can also be used for animal feeds. The use of by-products from grain harvest is also of interest. Stems and leaves can be fed to ruminants. Grain calyx, after roasting, can be added to poultry feeds. A good silage has been produced from the inflorescence.
(Documentation Bulletin No.76, 1989, 13-14)

STORAGE AND INFESTATION CONTROL

272 Grain storage bin

A leak proof PVC grain storage bin with a capacity of one quintal has been developed at the Tamil Nadu Agricultural University, Coimbatore with the objective of using biogas as a fumigant for stored grain pests of paddy, sorghum and turmeric.



The bin is rectangular shaped with a circular mouth. It has a removable lid and ring. The lid's gasket arrangements checks the leakage of biogas. The inlet gate valve ensures 75 per cent space for grains and the balance for biogas. The bin costs about Rs. 250/-

For more details contact: S.Mohan, P.T. Palaniswamy and Dr.M.Balasubramaniam, PHT Scheme, CAE, TNAU, Coimbatore-641003.
(The Hindu 15 November 1989, 24)

273 Storage loss in garlic

Garlic (Allium sativum) is an important spice crop used for flavouring dishes. Storage losses are greater in onion and garlic to study the effect of nitrogen, phosphorus and potassium fertilization on storage loss of garlic research was done during Kharif at the UAS, Dharward. Three levels each of nitrogen (100 and 200 kg/ha) phosphorus (50 and 100 kg) and potassium (50 and 100 kg) were included. The percentage loss of moisture in bulbs was recorded by keeping 1000 g of bulbs per treatment in a perforated bag at room temperature.

Normally, garlic storage is a problem due to loss of moisture and spoilage of cloves. It was observed that the percentage loss in weight in garlic bulbs was more when nitrogen was applied. Greater nitrogen application means more bulbs but it lowers storage quality while phosphorus and potassium improve it.

Increasing the level of phosphorus also increases moisture loss, as a result of greater dry matter accumulation, as is the case with increased level of potash which improves storage quality. The application of phosphorus and potash with nitrogen decreases the adverse effect of nitrogen storage.

For details contact: B. Sampath Kumar Setty and Dr. G. S. Sulikeri, University of Agricultural Sciences, Dharwad - 580 005.
(The Hindu 15 November 1989, 24)

274 Food-biocide for increased shelf-life

Raw fruits, vegetables, fish, sea-foods, meat poultry, etc are mostly contaminated with pathogenic micro-organisms, which not only make them unhygienic for human consumption, but also limits their shelf-life because they become unpalatable and foul smelling after certain time on storage, due to the deterioration in their natural taste and flavour. An extremely powerful biocide, Aquarine liquid, destroys these micro-organisms, including bacteria, viruses, moulds, fungus, algae, yeast, etc. effectively and economically. Aquarine also reacts with the putrid organic waste matters and destroys the foul odours. It controls the growth of micro-organisms, which promotes fermentation and putrefaction. Moreover, it destroys the unwanted blood-urea from the sea-foods. The raw foods, when properly treated by Aquarine remain fresh palatable for much longer period and have thus, longer shelf-life. Aquarine is equally useful as effective disinfectant for sterilising and deodorising the plant, equipment, containers, drainage, floor, water, etc.

For more details write to: Surfochem Industries, 3 Nilkanth Sadan, Peru Bagh, Aurey Road, Goregaon (East), Bombay - 400 063.
(Chemical Products Finder 8(4), 1989, 26)

275 Milk coating for fruits

Attila Pavlath of the US Department of Agriculture Research Service, Albany, California has found a way to keep sliced fruits and vegetables fresh for up to three days by covering them with an edible milk-based coating. If the technique is developed further, it may preserve food for several weeks, rendering items such as frozen pizza and other convenience foods obsolete.

Pavlath claims that this is the first time a way has been found to preserve fruits and vegetables that have been cut or peeled. The problem had been to find a coating that enables carbon dioxide to pass through it, so that the taste of the food would not change. It has to stick on to a moist surface and prevent oxygen passing in and water passing out. The coating has also to be edible and acceptable to the US Food and Drug Administration

Pavlath found a solution in milk protein which is capable of forming a very good film, and provides a barrier against water and oxygen when enzymes are added to the milk. According to him, these films can also be used to modify and produce exciting new flavours and colourings to standard food.
(Business World 9(11), 1989, 51)

276 Controlling a pest of redgram

Redgram, an important pulse crop, suffers huge losses both in the field and in store due to insect pests. Bruchids constitute a major threat as they multiply rapidly and cause extensive damage to the produce in store. Though chemical methods help in protection, they cannot be used because of the adverse effects produced such as residual toxicity, contamination and application hazards.

Insecticides of plant origin, are in contrast, more effective. Certain vegetable oils, plant products and inert dusts are considered cheap and effective grain protectants against pulse beetle.

In an experiment conducted to study control measures, neem oil, groundnut oil, sesame oil, sunflower oil, mustard oil, neem leaves, sweet flag, neem cake powder, red earth and cowdung ash were tested for 90 days in storage of red gram (ST-1). Of these, neem oil, groundnut oil, mustard oil, sesame oil and sunflower oil at 0.3 to 0.5 per cent concentrations (V/W), red earth (15.0 to 20.0 per cent), sweet flag (1.5 to 2.5 per cent), and neem leaves at two per cent concentrations (W/W) showed positive results. There was absolutely no infestation during the 90-day-period in store. Neem cake powder and cow-dung ash were found the least effective.

For details contact: Dr.K.Padmavathamma and Dr.P.Kameswara Rao, APAU, Tirupati-517502.
(The Hindu 1 November 1989, 24)

277 The dream of obtaining "environmentally-friendly" pest control

The dream of obtaining "environmentally-friendly" pest control agent which is harmless to man and small mammals and yet combats insect pests has been realised by a team of organic chemists at London's Imperial College of Science and Technology.

This follows work by Dr.David Morgan of Keele University who initially isolated the potent insecticidal compound, azadirachtin, from the tropical neem tree (Azadirachta indica) which is widespread throughout Southeast Asia and Africa and commonly exploited in local folk medicine. This tree produces azardiachtin as a natural defence against insects.

The natural chemical kills insects, including Locusta migratoria, by suppressing appetite, disrupting growth and upsetting mating. Scientists have observed no mammalian toxicity with azadirachtin, the compound does not accumulate in the food chain and it is readily degraded in the environment.
(The Hindu 1 November 1989, 24)

FOOD ADDITIVES

-Nil-

PROCESSES

278 Rice bran oil and cholesterol

A new "health oil" is looming on to horizon, which is not only claimed to be the best known yet for lowering blood cholesterol levels, but also accelerates growth, and promotes the health of the skin.

Extensive studies on rice bran oil and its various fractions at the National Institute of Nutrition (NIN), Hyderabad, and at the Central Food Technological Research Institute (CFTRI), Mysore, have shown that rice bran oil may have a better cholesterol lowering effect than any other vegetable oil.

The studies have shown that the composition of rice bran oil is very close to that of groundnut oil. Both the oils contain about 35% linoleic acid, an essential fatty acid, known to bring down the cholesterol level in the serum and liver. Further, rice bran oil possesses the highest hypocholesteremic property compared to other edible oils like safflower oil, sunflower oil, cottonseed oil, soyabean oil, sesame oil, corn oil and groundnut oil. Scientists of NIN claim that rice bran oil is even better than safflower oil - until now known as the best vegetable oil for lowering serum cholesterol.

A blend of rice bran oil and safflower oil, in the ratio of 7:3 is more effective because of the combination of high linoleic acid in safflower oil and unsaponifiable fraction of the rice bran oil, according to NIN studies.

Apart from this, rice bran oil has some other advantages. The oil contains high levels of tocopherols (Vitamin E) which confer stability against oxidation to the oil. Rice bran oil is also known to decelerate ageing in human beings. It is good for maintaining the integrity of the skin and, the keeping quality of the oil is also high when compared to other oils. Foods, deep-fried in rice bran oil, absorb less oil compared with foods fried in groundnut oil.

Investigations at CFTRI, have shown that oryzanol, a compound isolated from the soap stock obtained during alkali refining of rice bran oil, is responsible for lowering cholesterol. At 0.5 per cent concentration oryzanol can significantly lower serum and liver cholesterol and serum triglyceride levels in rats fed with high-cholesterol diet.

Oryzanol possesses a higher degree of cholesterol-lowering potency than curcumin or turmeric and capsaicin of red chillies. Further, it also inhibits platelet aggregation (clustering into a mass) in blood in experimental animals. High cholesterol and triglyceride levels in blood leads to atherosclerosis and associated coronary problems. This is further aggravated by the aggregation of platelets. Since oryzanol is potentially active against all these three factors, its usefulness needs to be emphasised.

Oryzanol is a mixture of some compounds such as ferulic acid esters of campesterol and B-sitosterol. In addition to its hypocholesterolemic activity, oryzanol has many possible pharmacological uses like acceleration of growth, regulation of oestrous cycle and ability to promote skin capillary circulation as demonstrated in experimental animals. Oryzanol is also reported to have anti-itching and anti-dandruff action. It is also considered to be a good antioxidant for oils and fats. Thus, rice bran oil is endowed with many unique beneficial qualities and one may brand the oil as 'health oil' and boost its popularity.

India is emerging as a leading producer of rice bran oil in the world with an annual production at 330,000 tonnes in the financial year 1988-89, comprising 135,000 tonnes edible grade oil and 195,000 tonnes of industrial grade oil. However, to reduce the dependence on imported edible oils, the vast potential of rice bran oil has to be fully exploited. One of the major problems in producing good-quality edible-grade rice bran and oil is the presence of lipase enzyme in rice bran which causes rancidity and makes both the oil and bran unfit for human consumption. Appropriate technologies developed by CFTRI, Mysore and other organisations for effective stabilisation of rice bran would help boost production of edible grade oil in the country.
(Chemical Weekly 35(7), 1989, 91-92)

279 Cholesterol and rice bran

Use of rice bran as food ingredient may find new popularity if ongoing research confirms that it is effective in reducing cholesterol levels in humans.

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299 Soyabean dehuller

With 18-20% oil and about 40% protein soybean is a doubly advantageous legumenous crop. It is used for making various edible products. Removal of hulls and making split pulses are the prerequisite for further processing of soybean, because the hulls being cellulosic are undesirable in diets.

The dehuller consists of two concentric cylinders, a clearance adjusting mechanism, a V-belt pulley drive mechanism, an exhaust fan just below the outlet of the outer cylinder, a perforated deflector and an electrical motor. The inner and outer cylinders were made of plain mild steel sheets of 10 guage thickness.

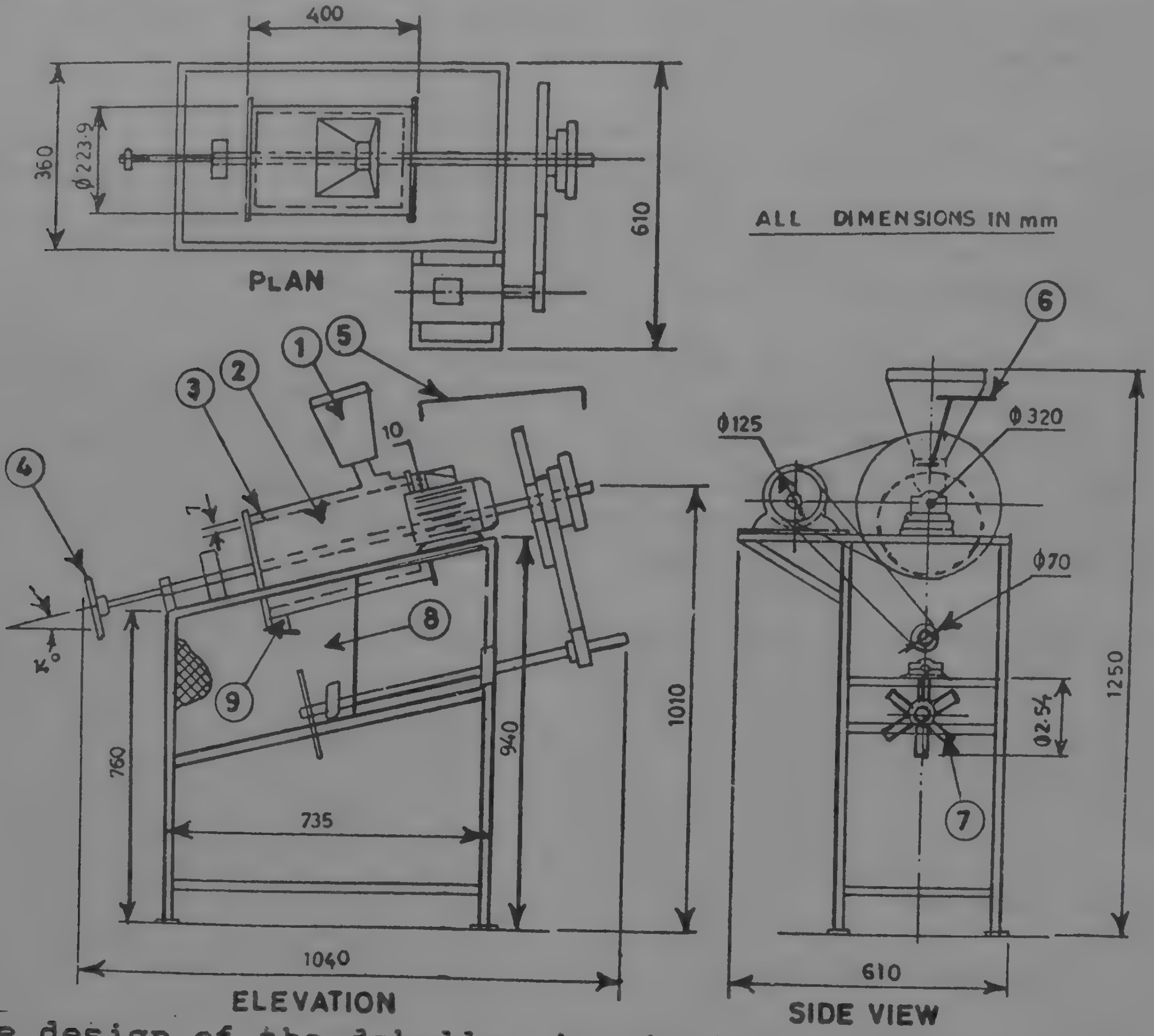
A 10 mm clearance in the neighbourhood of the inlet and 6-7 mm clearance in the neighbourhood of the exist can be adjusted with the help of an adjusting screw. However, any desired clearance below this value can also be maintained with this screw. Dents are made all along the outer surface of the inner cylinders while both surfaces of the outer cylinder are plane.

The developed dehuller has following specifications:

Overall length	: 1060.00 mm
Overall width	: 610.00 mm
Overall height	: 1250.00 mm
Dia. of inner cylinder	: 215.90 mm
Dia. of outer cylinder	: 225.90 mm
Length of inner cylinder	: 375.00 mm
Length of outer cylinder	: 400.00 mm
Dia. of exhaust fan	: 250.00 mm
Power requirement	: 1 hp
Speed of inner cylinder	: 450 rpm

About five quintals of soybean was dehulled on this machine. It was found to work quite satisfactorily. It has about 96 kg/hr capacity with about 3-4% brokens. The dehulling efficiency was found to be about 95%.

The cost of the dehuller was worked out to Rs. 3,000. Its expected life and annual use was assumed as 10 years and 300 days, respectively. One unskilled labour is required for its operation. Considering a combination of factors the cost of dehulling was computed to Rs 3/q beans.


400
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ELEVATION
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SIDE VIEW

The design of the dehuller is simple, and it could be fabricated in any moderately equipped workshop. It does dehulling, splitting and separation of hulls and brokens in a single run. It can be operated by an unskilled person. Split dals obtained are free from admixtures.
(Invention Intelligence November 1989, 518-519)

PACKAGING

300 Aspartame packages

The Ministry of Health and Family Welfare proposes to amend the statutory labelling on aspartame packages, reviving the prospect of indigenous manufacture of this billion dollar turnover low calorie sugar substitute.

Aspartame (a discovery of GD Searle of the US) is now being imported and marked by companies like Cadila. A synthetic protein, aspartame is 180-200 times sweeter than ordinary sugar (sucrose). Since one has to use a small quantity of aspartame to achieve the

Preliminary results of studies conducted at the Western Regional Research Laboratory of the Agricultural Research Service, U.S. Department of Agriculture, suggest that rice bran is beneficial in lowering cholesterol.

"Rice bran definitely lowers cholesterol in laboratory animals", said Dr. Robin Saunders, research leader of food quality at the Albany, California, laboratory. "Preliminary reports from human studies in Australia support these lab results. It certainly appears that stabilized or parboiled rice bran produces the same effect as oat bran".

Preliminary results from the research showed that a balanced diet including 10% dietary fibre from rice bran reduced cholesterol in the laboratory animals by more than 15%.

The technology developed by A.R.S. to preserve the freshness and extend the shelf life of rice bran is instrumental in the product's growing use in food. In the process, bran that has been milled off the rice kernel is run through an extruder, which deactivates enzymes and stabilizes the bran.

"Tests are under way to determine if feeding rice bran to poultry will lower the cholesterol level in eggs," he noted. Results of that study are expected later this year.
(SEA News Circular 3(8), 1989, 8-9)

280 Cheaper vanaspati

Dr. R. Rank, an eminent Indian molecular scientist, has developed a system to produce vanaspati in half the time than what is usually taken at present by vanaspati plants. The system is called R-Index hydrogenation system. Vanaspati produced by this system is said to be more hygienic. Dr. Rank demonstrated this system in plant scale at the Government Vanaspati Factory, Guwahati, and in a reputed vanaspati factory at Rajkot, in the recent past.

Further information can be had from: Dr. R. Rank, DBC312, Jolly Bhavan 2, 7 New Marine Lines, Churchgate, Bombay 400 020.
(Chemical Products Finder 8(3), 1989, 126)

281 Frozen milk

U.S. researchers have developed concentrated milk that's low in fat, free of cholesterol and can be stored in freezers, perhaps making unnecessary large plastic jugs that clog refrigerators. "What we've done is to remove the milk fat, and replaced it with oil - corn oil, peanut oil, soyabean oil or whatever," said George Bookwalter, a scientist at the Federal Northern Regional Research Centre here. The newly patented process could greatly expand milk markets and provide new convenience to milk drinkers.
(Deccan Herald 9 November 1989, 10)

BY-PRODUCTS AND WASTE UTILISATION

282 Vegetable wastes utilization

Specialists at the USSR Academy of Sciences and the Combustible Minerals Research Institute have developed a method to obtain petrol and diesel fuel from vegetable wastes. Professor Albert Lapidus, head of the research team, said, "Agricultural and timber waste, as well as kitchen garbage are first turned into gas by means of a special catalyser. This gas is turned into liquid fuel. It is in no way inferior to petroleum fuel as regards energy output". He said they were now developing a prototype of a mobile installation to produce fuel in distant and forbidding areas which are rich in timber and other wastes.
(Deccan Herald 30 November 1989, 10)

PROCESSED PRODUCTS

-Nil-

EQUIPMENT AND MACHINERY

283 Carton sealing machine

The 3AM Econopack automatic taping machine from ITW-Signode can apply BOPP or rigid PVC pressure sensitive sealing tape on the top and bottom of cartons simultaneously. Being a twin mast design and having a top and bottom positive belt drive, full closure of flaps is ensured. Specially designed machines are also offered for non-standard applications. The carton sealing machine is ideally suited for high speed, effective sealing of centre meeting cartons in industries like food processing, drug and pharmaceutical, breweries and distilleries, engineering, soap and detergents, aluminium foils, man-made fibre, electronics, etc. Econopack is backed by Nagarjuna Signode's servicing personnel and total spares availability.

For more details write to: Nagarjuna Signode Ltd., Nagarjuna Hills, Panjagutta, Post Box 1520, Hyderabad, Andhra Pradesh 500 482.
(Chemical Products Finder 8(5), 1989, 132)

284 Filling and sealing machine

Khosla Engineers offers the Finseal-11, a horizontal form filling and sealing machine that can pack a variety of products like biscuits, confectionery, buns, soap cakes, auto spares and stationery items in pillow shaped packs. It uses BOPP, polyester films and laminates as wrapping materials. The machine is well engineered for ease of maintenance, reliable operation and size changeability. Option of print registration is also available.

For more details write to: Khosla Engineers, 644 Sector 16, Chandigarh 160 015.
(Chemical Products Finder 8(5), 1989, 90)

285 Powder filling machine

A powder filling machine with a variable speed auger, for greater flexibility of fill and with greater power for more accuracy, has been developed in Britain. The Model 6000 also has a heavy duty clutch and brake which transmits more power to the auger, allowing heavy products to be filled with ease. It also gives optimum stopping repeatability for the greater accuracy possible. The machine is fitted with quick release guarding for safe separation and ease of maintenance and all product contact parts are manufactured from 316 stainless steel as standard, making it suitable for aggressive products and pharmaceuticals. The unit has easy to operate touch controls and a robust construction and is supplied with a wide range of optional extras. There are minimal maintenance requirements and no special tools needed. The agitator clutch drive offers the options of having the agitation in drive constantly or intermittently with the auger, or being shut off completely. Uses are in food, chemical and pharmaceutical industries.

For further information write to: Tri-Tech Systems Ltd., Unit 9, Cliffe Industrial estate, South Street, Lewes, East Sussex BN86JL, U.K.
(Industrial Products Finder 17(11), 1989, 125)

286 Rotary type cup filling machine

Panpack Marketing offers an automatic rotary type cup filling machine for use in food and pharmaceutical industries. It can handle plastic cups of different sizes and shapes. The machine is ideally suited for filling ice cream and can also be used for jam, honey, oil, margarine, yoghurt, fruit juice, soft drinks and cream.

For further information write to: Panpack Marketing, P.B.No.48, Panchal House, Near Muncipality Office, Anand, Gujarat 388001.
(Industrial Products Finder 17(11), 1989, 52)

287 Automated sandwich maker

Equipment for sandwich production with automatic and accurate deposition of the filling and cutting has been developed in Britain. The Automatic Sandwich Line from Bryant offers clean, rapid, continuous and accurate production of sandwiches under computer control. The single line has a throughput of up to 1,200 sandwiches per hour (throughputs of up to 2,300 and 3,600 per hour can be achieved with 2- and 4-track models, respectively). Single, double and triple deck sandwiches can be made, and cutting is neat and free of smears. Slices of buttered bread are placed automatically, or by hand, on a moving belt within a V square formed by two ridges. Pumpable fillings are deposited automatically and accurately. The weight of these can be controlled down to 6 g. Fillings may be changed without stopping the machine. Waste is reduced considerably because the depositors do not operate if the bread is missing from the line. Operation is clean and hygienic and the equipment is made from food quality stainless steel. The equipment can be customised to suit the requirements of individual caterers.

For further information write to: Bryant Ltd., Belam House, Wycombe Road, Stockenchurch, Buckinghamshire HP14 3RR, U.K.
(Industrial Products Finder 17(11), 1989, 63)

288 Doughnut machine

The SS1200 A Donut Machine entertains customers as it operates, with flashing lights, warbling sound, tiny rocking astronaut, and whirling logo disk. Just 93,98 cm long, the machine produces 1,200 mini doughnuts/hour. Normal profit to the operator is said to be 85% of sales. Other models allow faster production and bigger doughnuts.

For further information write to: Lil' Orbits, Inc. 8851 Research Center, Minneapolis, Minnesota 55428, U.S.A.
(Industrial Products Finder 17(10), 1989, 115)

289 Biscuit stacking machine

This machine automatically aligns biscuits coming out from cooling conveyors for final packing, without breaking or damaging the biscuits. It can contribute to considerable saving in labour and time in biscuit manufacturing plants. The machine can handle many shapes and sizes of biscuits and setting can be easily done as per batch requirements. The unit is designed for various speed requirements which can be selected by a V belt driven variable pulley, available in various sizes ranging from 1.5 ft to 2.75 ft.

For further information write to: Soni Engineering Works, Subhash Nagar, Near Kali Mata Mandir, Follower Lane, Ambernath Road, Ulhasnagar, Maharashtra 421 0903.
(Industrial Products Finder 17(10), 1989, 130)

290 Heavy duty kneading machine

FE manufactures heavy duty Sigma Kneading Machine which is specially designed for mixing, masticating, breaking down, dispersing, wetting down and homogenising viscous materials of the strongest consistency used in the chemical, dyestuff, food, paint, and adhesives industries. The kneading blades are casted in one piece and is of duplex type so as to avoid any dead spots which on other blade types accumulate unwetted solids and cause non-uniformity of product. Both blades rotate in opposite direction towards one another and in different speeds having ratio 1:2 or any ratio that the user requires so as to ensure intensive lifting and homogenising of the material. Heavy stuffing boxes are provided with roller bearings, phosphor bronze bushing and Teflon impregnated seals to ensure smooth working and longer life of machine. The entire container can be tilted from horizontal to vertical position up to an angle of 110° manually, electrically, or hydraulically as desired. Bottom discharge can also be provided to facilitate quick discharge. Vacuum and Jacket arrangement is also provided to suit requirements. The machine is available in capacity ranging from 6 to 1,000 kg in SS and MS construction.

For more details write to: Frigmaires Engineers, Bharat House, 2nd Floor, 104 Bombay Samachar Marg, Fort, Bombay 400 023.
(Chemical Products Finder 8(5), 1989, 130)

291 Bottle washing compound

Indo Fluorine's Synflow is a very useful liquid cleaning formulation and an economical substitute for conventional caustic washing compounds used for bottle washing and tank cleaning. Use of 3.5% of Synflow in washing solutions can effectively clean tanks and bottles to remove adhering dirt, mould and other impurities. The compound is water soluble and can be rinsed easily. It does not form scales or corrode the bottle washing machinery and is safe to handle. The applications of Synflow are for bottle washing in milk dairies, breweries, soft drinks and wash cleaning of tanks vessels, tankers and empty drums.

For more details write to: Halberd Marketing, 14 Prasad Chambers, Opera House, Bombay 400 004.
(Chemical Products Finder 8(5), 1989, 127)

292 Filters for wineries

Pall Process Filtration Ltd, UK offers a wide range of filters for the clarification and microbiological stabilisation of all types of wine, without the introduction of any undesirable characteristics. Fibres, particulates and micro-organisms are removed without disturbing unique and often delicate qualities of taste, colour and bouquet that characterise a wine. Over the last few years, the company has devoted a great deal of attention to the highly critical terminal filtration stage, and bottling can now be carried out with greater confidence and cost-efficiency. To make both production and filtration more economical, however, it is necessary to make improvements throughout the process with more effective contamination control in the prefiltration stage. With this in mind, Pall has developed cartridge filters that provide the industry with cost-effective and reliable filtration. This 'total' approach offers the wine bottler several important benefits viz filtration of a consistent and defined quality; high volume throughput; and more economical filtration.

For more details write to: Filtech Pharmalab Pvt Ltd., Star Metal Compound, LBS Marg, Vikhroli (West), Bombay 400 083.
(Chemical Products Finder 8(5), 1989, 9)

293 Filters for breweries

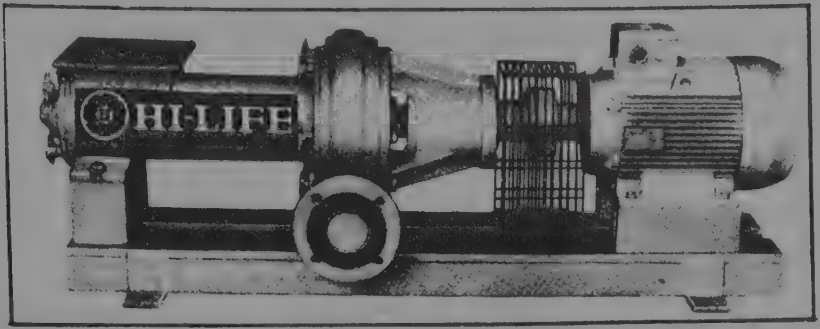
Pall Process Filtration Ltd, UK offers quality filters to the brewing industries. Reliable performance, space savings, hygiene, simplicity of use are a few of the salient features. Savings in capital outlay, labour costs, energy consumption and down time improve the process economies. The filter cartridges offered are designed for secured sealing and rapid change-overs. They can be repeatedly steam sterilised and cleaned in situ for a longer service life. These cartridges are made from Nylon 66, glass fibre or polypropylene media for liquid applications. For air or gas filtration pure cellulose or PTFE media can be offered. SS filter media are also available. Housings required for the cartridges are manufactured in India under advise of Pall, UK, SS 316L construction with compact, leak proof design is offered for maximum hygiene.

For more details write to: Filtech Pharmalab Pvt Ltd., Star Metal Compound, LBS Marg, Vikhroli (West), Bombay 400 083.
(Chemical Products Finder 8(5), 1989, 18)

294 Crushing pump for food industries

This is a centrifugal pump whose suction branch is replaced by a blade. The product, by Archimedian screw to centrifugal impeller, during the distance is sufficiently crushed under certain conditions. The product on coming out can be quite as pulp. The pump is used in food industries, especially to handle residues of fruit, vegetable and fish, particularly in tomato treatment if previously scalded.

This pump can transfer the peeling discards directly to the preheater without going through the crushing. While the pump casing, impeller, Archimedian screw and cover come in gun metal, the crushing casing, shaft, stuffing box in SS 304 or SS 316. To have an easy dismantling for cleaning, all main parts are fixed by wing nuts.



For more details write to: Hi-life Manufacturing Co, PO Box 43, GIDC Estate, Vatva, Ahmedabad, Gujarat 382 445.
(Chemical Products Finder 8(5), 1989, 12)

295 Mixers and blenders

Alpen Mixers and applications in the drug, pharmaceutical, food, paint pigment, dyes and chemical segments of the process industry. They are suitable for liquid-liquid, solid-liquid, and solid-solid mixing. A wide range of models is offered to choose from: stationary tank mixers, ribbon blenders, rotary double-cone blenders, rotary twin shell blenders, Nauta mixers, Sigma mixers/kneaders, and planetary or change-can mixers. Materials of construction include carbon steel, stainless steel (AISI 304, 304 L, 316, 316 L). Inconel 600 and Monel, Jacketing for heating/cooling, where required, can be provided. Lump-breaking; arrangement is incorporated where hygroscopic or lump-forming materials are handled. Manual or mechanised tilting arrangement is offered where top discharge is required, the latter with inching mechanism.

For further information write to: Alpha Process Engineers, 102 Savera A, J P Road, Andheri (W), Bombay 400 061.
(Industrial Products Finder 17(11), 1989, 157)

296 Aseptic packaging system

Central India Packaging offers the Bowater aseptic liquid packaging machines and bags. Aseptic packaging is suitable for low and high acid products eliminating processing contamination and allowing transportation and storage at ambient temperatures. Various types of products such as juices, ketchups, pastes and concentrates of fruits and vegetables, milk and milk products, etc can be packed and stored at ambient temperatures for long time. Pack sizes range from 3 to 250 litres all of which can be filled on the same machine with minor adjustments. The bags, in turn, are packed into corrugated boxes, 200 litre steel drums, plastic barrels, etc. Various sizes of filling machines are available for packing from 1,000 to 6,000 litres per hour. Fully automatic machines with higher filling capacity are also available. Various types of models to operate on a unit basis or part of an integrated automatic filling lines can be supplied. Standard sterilants can be used for cleaning the machine.

For more details write to: Central India Packaging Company Pvt

Ltd., 3-6-140/2, Liberty Road, Himayatnagar, Hyderabad, Andhra Pradesh 500 029.
(Chemical Products Finder 8(3), 1989, 98)

297 A versatile solar dryer

A simple, foldable solar dryer has been designed and fabricated by Food Technology and Enzyme Engineering Division of BARC for the preparation of raisin from grapes. This dryer will be very useful for small farmers. Production of grapes in India is increasing, and farmers depend mostly on sun-drying to preserve this seasonal and perishable commodity. Sun-drying in the open has got its limitations and inherent problems. The foldable solar dryer, with a capacity of 20 kg of grapes, can bring down the moisture content to 16% in 4 days. Experimental runs carried out at BARC have indicated that both the volume and moisture content of grapes decrease by a factor of about 5 during this period. It can be easily fabricated using commonly available materials. The cost of the unit will be less than Rs.2,000, and will decrease on mass production. Quality of the raisin prepared by using the solar dryer was found to be good even after five months storage at normal temperature. This dryer is versatile, and can be used for drying of extruded products, papads, green pepper etc. with equal efficiency.
(BARC Newsletter No.69, August 1989)

298 Seraphin Poha Machine

The machine is manufactured in India with technical collaboration of Seraphin Engineering Works. This is beneficial and most handy in working and out put by the Poha manufacturers. It is driven by V.belt, with motor suitably attached to main frame of 7.5 H.P./3 Phase/960 R.P.M. Totally enclosed; heavy duty double ball bearing in cast iron, dustfree housing; smooth working with least vibratory noise; Rare break down of main verticle shaft and least repairs; Saving in power consumption more than 10%. Capacity: 8 to 10 Qtls. (per diam i.e. 8 hours). Machine requires ordinary semi skilled labour for Poha processing; roasting operation is separate which requires semi skilled labour. Space: 5'x3' Total working space with machine 10' x 6' minimum.

For further information write to: Spark Electric Works, Agrasen Marg, Behind Police Station, Gondia - 441 601.
(Documentation Bulletin No.76, 1989, 14)

299 Soyabean dehuller

With 18-20% oil and about 40% protein soybean is a doubly advantageous legumenous crop. It is used for making various edible products. Removal of hulls and making split pulses are the prerequisite for further processing of soybean, because the hulls being cellulosic are undesirable in diets.

The dehuller consists of two concentric cylinders, a clearance adjusting mechanism, a V-belt pulley drive mechanism, an exhaust fan just below the outlet of the outer cylinder, a perforated deflector and an electrical motor. The inner and outer cylinders were made of plain mild steel sheets of 10 guage thickness.

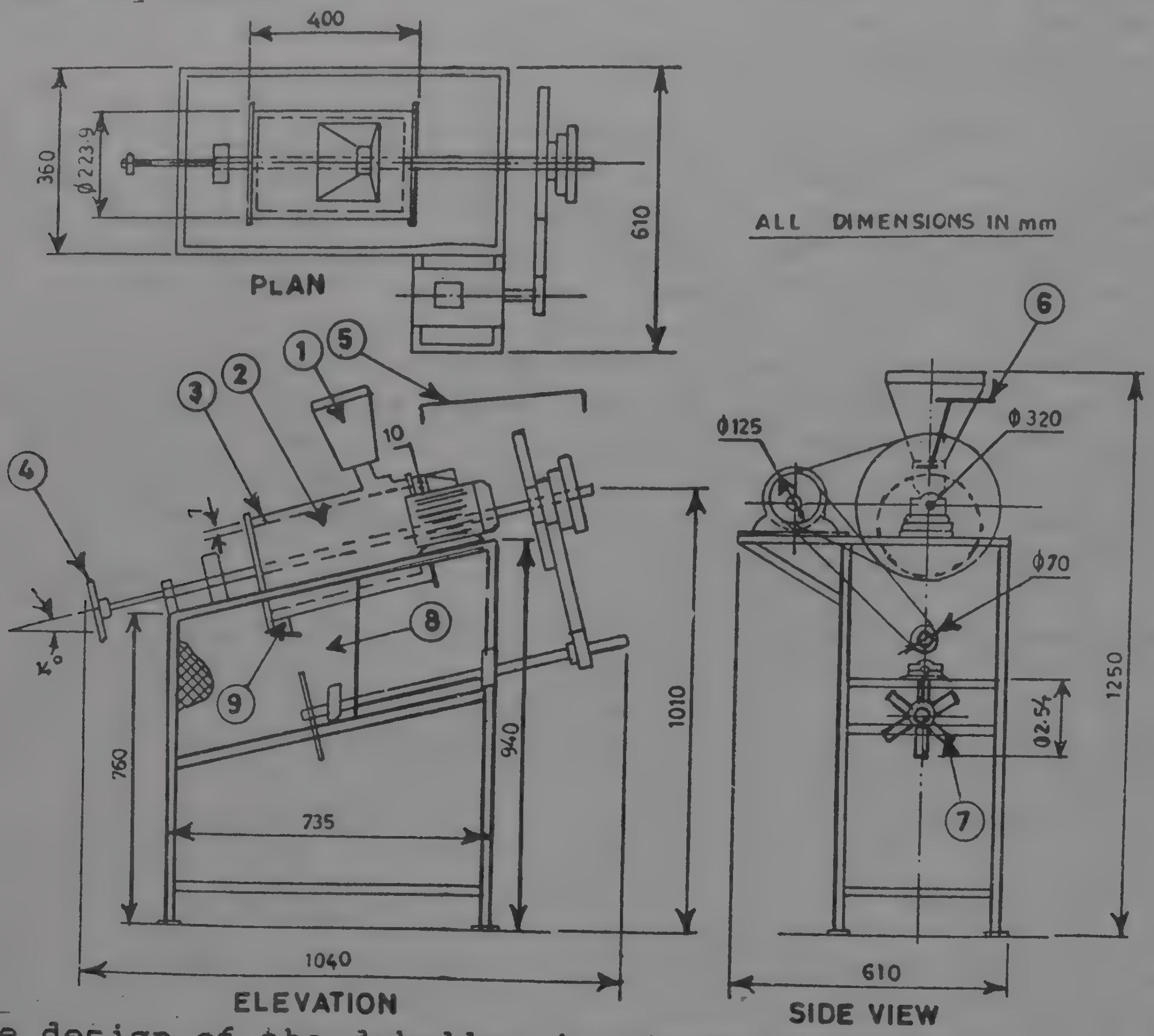
A 10 mm clearance in the neighbourhood of the inlet and 6-7 mm clearance in the neighbourhood of the exist can be adjusted with the help of an adjusting screw. However, any desired clearance below this value can also be maintained with this screw. Dents are made all along the outer surface of the inner cylinders while both surfaces of the outer cylinder are plane.

The developed dehuller has following specifications:

Overall length	: 1060.00 mm
Overall width	: 610.00 mm
Overall height	: 1250.00 mm
Dia. of inner cylinder	: 215.90 mm
Dia. of outer cylinder	: 225.90 mm
Length of inner cylinder	: 375.00 mm
Length of outer cylinder	: 400.00 mm
Dia. of exhaust fan	: 250.00 mm
Power requirement	: 1 hp
Speed of inner cylinder	: 450 rpm

About five quintals of soybean was dehulled on this machine. It was found to work quite satisfactorily. It has about 96 kg/hr capacity with about 3-4% brokens. The dehulling efficiency was found to be about 95%.

The cost of the dehuller was worked out to Rs. 3,000. Its expected life and annual use was assumed as 10 years and 300 days, respectively. One unskilled labour is required for its operation. Considering a combination of factors the cost of dehulling was computed to Rs 3/q beans.


400
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SIDE VIEW

The design of the dehuller is simple, and it could be fabricated in any moderately equipped workshop. It does dehulling, splitting and separation of hulls and brokens in a single run. It can be operated by an unskilled person. Split dals obtained are free from admixtures.
(Invention Intelligence November 1989, 518-519)

PACKAGING

300 Aspartame packages

The Ministry of Health and Family Welfare proposes to amend the statutory labelling on aspartame packages, reviving the prospect of indigenous manufacture of this billion dollar turnover low calorie sugar substitute.

Aspartame (a discovery of GD Searle of the US) is now being imported and marked by companies like Cadila. A synthetic protein, aspartame is 180-200 times sweeter than ordinary sugar (sucrose). Since one has to use a small quantity of aspartame to achieve the sweetening effect of sugar, it is a boon to calorie watchers and diabetics. One gram of sugar contains four calories compared to 0.4 calorie in aspartame.

The Indian affiliate of GD Searle, Searle (India) Ltd., has been unable to implement a letter of intent to manufacture aspartame because the notification on labelling virtually makes the product a prescription drug. Nowhere in the world is aspartame sold as a drug and GD Searle does not want the Indian firm to market its product as such..

The Department of Health notification of April 15, 1988, requires every package of aspartame marketed as sweetener to carry the following warning, "1. for diabetics only, 2 to be used on medical advice, 3. not to be used by pregnant women, children or others having symptoms of phenyl ketonuria". Unlike in the West, aspartame cannot be marketed as powder in dry mixes or in liquid systems in India.

Worldwide, the only warning incorporated on aspart6ame packages is the one regarding phenyl ketonuria (PKU). This is because PKU patients cannot break down phenylalanine, an essential amino acid required by the body for protein synthesis. PKU patients are also advised to restrict foods like skimmed milk which contains six times, more phenylalanine than an equal volume of aspartame-sweetened beverage. Incidentally, only one in 30,000 in the West suffer from PKU. In India, only one in 60,000 has the disease, according to a study.

Except for the PKU restriction, all other restrictions are unwarranted, according to the company's representation to the Government. This is supported by a large number of scientific studies on the safety of aspartame consumption during pregnancy. The company has forwarded relevant extracts from scientific journals to the Central Committee of Food Standards (CCFS).

It is not known what are the labelling changes being recommended by CCFS. A Gujarat company has been advertising aspartame without incorporating the statutory warning, without inviting any punitive action. Multinationals have often been criticised for double standards in marketing their products in home territory and in the Third World.

This is a novel case of a multinational being forced to adopt a different standard only for Indian market.
(Chemical Weekly 45(4), 1989, 45)

ANALYSIS

301 Monitoring of glucose in fermentation processes by commercial glucose analyzer

A commercial glucose analyser originally designed for monitoring of blood glucose has been successfully employed in fermentation processes in industry for monitoring glucose. The system operates in such a way that the measured value is updated every 90 sec. The measuring range of the system is 0-5 g glucose/litre and the accuracy is ± 7%.

The response time was found to be approximately 6 min. The system was employed to follow fermentations with two different microorganisms, namely Saccharomyces cerevisiae and Escherichia coli in media containing upto 5 g/litre of glucose. The performance was fully satisfactory and the values had a very good correlation with off-line analyses.
(Appl. Microbiol Biotechnol 28(1), 1988, 32-36)

302 Technique to detect Food Irradiation

Researchers at the Scottish Universities Research and Reactor Centre, have developed a new technique to detect food irradiation.

The test, relying on thermoluminescence (TL) of tiny mineral particles on the food, is economical and easy to carry out. Test equipment, a TL reader and photon counter, cost about £ 20,000.

A rapid screening procedure, reliable in about 93% of the cases, can be available immediately to customs laboratories, screening for illegal imports of irradiated food. A more reliable test, 99.9% accurate, is harder to carry out and involves the re-irradiation of the sample. Irradiation will become legal in the UK under new food bill to be introduced shortly.

The TL tests are only effective for fruits, vegetables and spices. Other luminescence tests for poultry and sea food are expected to be ready in near future. The work on three different luminescence techniques is funded by the Ministry of Agriculture, Fisheries and Food.

Cross contamination of non-irradiated food from treated food is one of the main problems the test faces. Although the small size of the particles that are tested means cross contamination can occur, the concentrations of these particles on non-irradiated food would evidently be lower, according to Scotish researchers. Also, sample credibility will be important. Knowledge that in some cases bright lights can interfere with the test could be used to avoid detection.
(Journal of Scientific and Industrial Research 48(10), 1989, 499)

COMMERCIAL INTELLIGENCE

PRODUCTION (Raw Materials)

303 Oilseeds production and oil availability - Year 1988-89

Figures in lakh tonnes

Oilseeds	Production	Oil availability		
		Expeller	Solvent	Total
Groundnut	77.0	16.55	0.75	17.30
Rape/Mustard/Toria	33.0	9.80	0.75	10.55
Sesamum	6.5	2.09	0.10	2.19
Sunflower	5.5	1.71	0.42	2.13
Safflower	5.0	1.07	0.05	1.12
Castor	4.0	1.67	0.02	1.69
Niger	2.0	0.49	0.05	0.54
Linseed	4.5	1.42	-	1.42
Soyabean	17.0	-	2.46	2.46
Total	154.5	34.80	4.60	39.40

(Oils and Oilseeds Journal 41(7-9), 1989, 47)

304 Fish production

Fish production in the country in 1988-89 was a record 3,152 million tonnes — four times higher than the production of 7,52,000 tonnes in 1950-51. Stating this at a meeting of the National Fisheries Advisory Board in New Delhi recently, the Agriculture Minister, Mr. Bhajan Lal, said that this was only one-third of the total estimated potential in the country. Fish production needed to be raised to at least six million tonnes by 2000 AD to meet the estimated requirement of the country.

Mr. Bhajan Lal said that to reduce the gap between the demand and supply of fish, it was essential that a comprehensive action plan was adopted to concentrate on aquaculture activity, deep sea fishing, modernisation of the traditional marine fisheries sector and setting up of infrastructure facilities for fish landing, processing and marketing.

All these activities called for better coordination between various departments, financial organisations and private entrepreneurs, he said.
(Economic and Commercial News 19(45), 1989, 10-11)

EXPORT

305 Cashew export

During the eight-month period, January to August 1989, India exported 28,055 tonnes of cashewnuts valued at Rs. 227.31 crores, representing an increase of 36 per cent in quantity and 37 per cent in value over the figures for the same period of 1988.

While exports improved appreciably to Australia, Canada, Czechoslovakia, Japan, Kuwait, Netherlands, New Zealand, Saudi Arabia, Singapore, USA and the Soviet Union, it decreased in the case of the FRG, Hong Kong and U.K.

The purchase of 2,506 tonnes by the USSR was 149 per cent more than in the previous period, while the purchase of 7,014 tonnes by the Netherlands was 22 per cent more. However, the unit value realisation over-all was only Rs.80.09 a kg against Rs. 80.14 in the previous period, showing a marginal reduction of 0.06 per cent. The trend of exports reveals that more countries are now buying Indian cashew than in previous years.

During the January to August period of 1989, 18,190 tonnes of raw cashew were imported in India, valued at Rs. 25.81 crores, a slightly larger quantity than in previous years, for the purpose of processing.
(The Economic Times 5 December 1989, 3)

306 Rapeseed extraction exports

There is a veritable boom in exports of rapeseed extractions. These exports amounted to three lakh tonnes valued at Rs. 38 crores in the first half of the current fiscal year against around 41,000 tonnes worth Rs. 6 crores during the corresponding period of the preceding year.

The phenomenal rise in exports is attributed to the bumper crop of rape-mustard and promotional activities undertaken by the Solvent Extractors' Association of India (SEA), according to industry sources.

A delegation sponsored by SEA had visited the Far East and certain other countries in March to tap export potential of rapeseed and other extractions.

As a result of the delegation's visit Japan, Singapore and South Korea, which traditionally depended on China, emerged as major buyers of Indian rapeseed extractions during April-September 1989.
(Financial Express 14 October, 1989, 11)

307 Soyabean meal exports

The soyabean processing industry, which is in the red, is expected to report better results in 1988-89. The industry, comprising over 80 units mainly located in Madhya Pradesh, is likely to raise its capacity utilisation from a mere 25 per cent to about 50 per cent. Although the industry may not be able to wipe out the losses accumulated during the last few years, most units will be able to show operational profits.

All the units are now actively engaged in processing, thanks to the abundant supply of soyabean this season. Soyabean production has shot up from 8.5 lakh tonnes last season to 17 lakh tonnes this season, in view of the favourable monsoon in Madhya Pradesh, the main soyabean growing State in the country. The soyabean production of this size will yield 13.5 lakh tonnes of soyabean meal. Since the domestic demand for this protein rich meal is negligible, a bulk of it is expected to be exported.

According to present indications exports are expected to exceed 10 lakh tonnes valued at Rs. 350 crores during the current season against 3.5 lakh tonnes worth Rs. 106 crores last season.

Besides a good harvest at home, the favourable price situation in the world market has enabled processors to book orders for the exports of soyabean meal. They are reported to have sold about six lakh tonnes of soyabean meal and out of which three lakh tonnes have already been shipped by them.

The soyabean meal price has shot up by $ 100 to $ 250 per tonne in the world market in view of the drought conditions in soyabean growing areas of the U.S., the largest soyabean producing country in the world. Soyabean production in the U.S. is stated to have dropped by 25 per cent to 43 million tonnes this season.

The soyabean processing industry in India can do better if it continues to get its raw material requirements even during the lean period from May to October, and can earn foreign exchange upto Rs. 500 crores. The demand for soyabean meal continues to be good, since it is most acceptable source of protein for compound-feed industry in the world.
(The Oils and Oilseeds Journal 41(7-9), 1989, 63)

308 Barley export licence issue method revised

The Commerce Ministry has issued fresh guidelines for the export of barley which is allowed to be sold in foreign markets within a ceiling.

According to a public notification issued on August 28 by the Chief Controller of Imports and Exports (CCI&E), the export of barley by the State Trading Corporation (STC) and private trade will be permitted within the limited ceiling subject to certain conditions. Henceforth, the ceiling for barley export for distribution to the private sector will be placed at the disposal of the Agricultural and

Processed Food Products Export Development Authority (APEDA), New Delhi.

The exporters will be required to register their contracts backed by 100 per cent irrevocable letter of credit with APEDA. They will also have to submit a bank guarantee to the tune of one per cent of the FOB value as per the letter of credit in favour of the government.

APEDA will not allocate more than 10 per cent of the total ceiling to any individual exporter and will release a ceiling in favour of exporters on first-come-first served basis.

On receipt of release advice, along with the bank guarantee, the licensing authority concerned will issue an export licence with a validity period of six months within 48 hours.

The entire export will have to be made within the validity period failing which the bank guarantee will be forefeited by the government and deposit in its account.

Further, no contracts will be allowed to be registered after March 31, 1990, nor would any export be permitted by APEDA even if the quantity of the ceiling remains unutilised.

Similarly, STC will be allowed to export till March 31 and not after that even if the ceiling remains unutilised.
(Economic and Commercial News 19(37), 1989, 7)

309 Marine products export norms

The Minister for Food Processing Industries, Mr.Jagdish Tytler, has hinted at relaxation of laws to promote exports of marine products.

Inaugurating the 10th annual general meeting of the Association of Indian Fishery Industry here on Friday, he regretted that the industry has not been able to respond to commercial pressures despite a number of incentives offered by the Government.

He assured separate fishery zones to evenly distribute efforts for different varieties and species abundantly available in the Indian exclusive economic zone. The Government is working with the industry to ensure an integrated development of the fishing industry, he said.

The President of the Association, Dr.K.R.Prasad, suggested that the Government set up a fish marketing organisation with a network of main and intermediate cold-storage centres and well-designed retail outlets.
(Financial Express 2 October 1989, 6)

310 India should export cooked and peeled shrimps

Our exports of shrimps have declined in quantitative terms from 5624 tonnes to 4901 tonnes (12.8%) and in value terms from 18.05 million to 14.70 million (18.6%). There has been some improvement in export of other marine products, with the result that exports of marine products as a whole recorded a decline of 12.6%. The total shrimp imports of UK from all sources declined by 29.1% in quantity and by nearly 23% in value.

Shrimps

	1987			1988		
	Q	V	£/kg.	Q	V	£/kg.
Total	34,864	109.26	3.13	24,733	84.18	3.40
India	5,624	18.05	3.21	4,901	14.70	2.99
Pakistan	3,308	8.83	2.67	3,983	9.03	2.27
Bangladesh	2,580	8.13	3.15	2,296	7.87	3.43
Thailand	2,255	7.31	3.24	1,415	4.72	3.34
China	1,534	5.02	3.27	2,033	5.42	2.67

(Quantity: tonnes Value: million £)

In comparison, our exports seem to have fared better than the general decline of British imports. The British market in warm water shrimp has declined by nearly 20% with a corresponding increase taken by cooked and peeled shrimps which India does not export. Hence, the pattern of summer trades last year was one of slow demand and weakening prices.

Owing to this, many of the importers had concluded that there would be no upturn in demand for warm water shrimp and had not procured shrimps from any source. Some of these importers are known to have cleared their stocks at prices even lower than those offered by overseas suppliers. Since the average unit value realisation of cooked and peeled shrimps is more than that of frozen warm water shrimps. India should look into the possibility of exporting the former. Thailand has rapidly adjusted to the new trend and its exports of cooked and peeled product have risen by 65% since 1986. The Marine Products Export Development Authority (MPEDA) organised participation in two major Food Fairs in West-Europe-Sial Food Fairs, Paris in October, 1988, and IFE 1989, London in January, 1989. Visits of trade delegations to the UK and individual sales teams to UK, particularly for IQF shrimps, along with selective publicity in Food/Trade journals is expected to prove useful.
(Seafood Export Journal 21(6), 1989, 34-35)

311 MEP for basmati rice

The government has increased the minimum export price (MEP) of basmati rice to Rs. 9,500 per tonne (FoB) from Rs. 8,000 per tonne (FoB).

The higher MEP takes retrospective effect from September 15 when public notice was issued by the chief controller of imports and exports.

The MEP has been increased keeping the in view uptrend in the international market, according to official sources.
(Economic Times 24 September 1989, 1)

312 Spices Exports

Spices exports from India crossed the 94,000 tonnes mark in 1988-89 for the first time in eight years, according to agency reports.

The previous peak was in 1979-80 when 114958 tonnes were exported. The 1988-89 performance is the third best in spices exports history, according to an official press release.

The foreign exchange earned from spices, however, was highest in the year 1987-88 at Rs. 2960 million, the year 1988-89 was the second best in terms of export earnings at Rs. 2828 million, the release added.

The commodity-wise target and achievements analysis showed that in terms of quantity, pepper, cardamom (large) ginger, turmeric and miscellaneous spices performed better in 1988-89 exceeding the target set for the year.

Regarding export value in 1988-89 only cardamom (small) fell far short of the target. The major shortfall in demand from the Middle East, primarily because of uncompetitive Indian prices against Guatemala offers and predominance of the domestic market with higher prices. However, an additional 570 tonnes of cardamom (small) could be exported in 1988-89 as compared to 1987-88.

Shortfall in quantitative target of chillies in 1988 was mainly due to delay in shipment to Sri Lanka. Two thousand tonnes targetted for shipment could not be transported fully before April last.
(Economic and Commercial News 19(36), 1989, 9)

313 Incentive scheme for tea exports extended

Union Commerce Minister Dinesh Singh announced that the incentive scheme for south Indian tea exports would be extended by one more year. The extension is in response to a plea made by the United Planters Association of Southern India (UPSAI).
(Deccan Herald 7 September, 1989, 14)

314 Trade centre for export promotion

The steering committee under the chairmanship of the Commerce Secretary, Mr. A. N. Verma, has finalised the draft proposal for setting up or India Trade Centre (ITC) here.

The proposal envisages a budget estimate of Rs.4.11 crores in the first year. It is proposed to be located in new exhibition complex which is under construction in the Trade Fair Authority of India (TFAI) complex.

The primary objective of ITC would be to strengthen the institutional framework for export promotion and offer under one roof trade information and trade promotion services designed to cater to the needs of the trade and industry and project India's capability abroad.

The centre would concentrate on 14 product groups which have been identified as thrust sectors for exports. Area-wise it would concentrate on about 60 countries which have growth potential and which cover about 80 per cent of India's exports.

ITC would have a modern well-equipped communication system with computer facilities for collection, storage, retrieval and dissemination of information on trade opportunities, joint ventures and global tenders.

The 14 thrust product group includes agricultural and plantation products, processed foods, ores and minerals, leather and leather manufactures, gems and jewellery, engineering goods, computer software, projects and consultancy, textiles of all fibres, carpets, handicrafts (other than carpets), chemicals, pharmaceuticals and allied products, plastics and plastic products and sports goods.

The thrust countries include 12 from West Europe, seven from East Europe, two each from North America, South America and Caribbean, eight from West Asia 12 from South East and Far East, one each from Central America, Oceanic, three from North Africa and nine from Africa and south of the Sahara.

The objective of ITC would be to provide efficient national-level trade information service for the use of business community, export promotion organisations and government departments, process information relating to thrust products and markets and build up a data bank which would guide and steer promotional activities; collate and compile "user friendly" computer data base in association, with existing and recognised international data bases to assist the export community with market intelligence to exchange international data through global network's pass on information with minimum time lag to enable linking intelligent information with immediate export strategy and action; provide facilities for display of products both in India and abroad and provide various infrastructural facilities to visiting buyers.

In suggesting these activities, the committee was guided by the approach that ITC be organised on modular lines with the facility to develop and expand further as it evolves its various functional parameters over a period of time. It would be necessary for the centre, however, to go beyond these limited activities and gradually evolve an aggressive thrust by way of organising buyer-seller meets, contact promotion programmes and department store promotions abroad.

The membership fee proposed by the committee is Rs. 35,000 per annum. The centre would have a chairman and managing director. The information management division is proposed to have 28 officers (nine supporting staff), 18 in trade promotion division (seven) and eight in administrative services division (12).
(Financial Express 31 October 1989, 1)

TRADE INFORMATION

315 Cooperation in food processing industries

The Union Minister of State for Food Processing Industries, Mr.Jagdish Tytler, has said that India was considering to export meat products to Turkey. He said India was also keen to extend assistance to Turkey by way of transfer of technology in dairy products.

Mr.Tytler said India was interested in the import of seed and seed technology from Turkey.

Mr.Tytler and the Turkish Minister expressed desire to encourage exchange of visits by private businessmen from either country, apart from visits by official delegations, with a view to expanding trade between the two countries in the field of food processing industries.
(Economic and Commercial News 19(40), 1989, 5)

316 Fruit processing unit: Neramac, USSR sign pact

The North Eastern Regional Agricultural Marketing Corporation Ltd (Neramac), will be entering into a joint venture agreement with Russia to set up a fruit juice processing unit. The new unit is likely to come up either in Manipur or Meghalaya.

While Neramac will have a stake of 60 per cent in the new unit, the Russians will contribute to the remaining 40 per cent stake, according to Dr.L.Krishnaswamy, Chairman cum Managing Director of Neramac. The project cost is expected to be around Rs eight crores.

The machinery for the new unit will be provided by Fata Company of Italy and an Italian bank has agreed to provide the requisite finance. Bharat Laminates, Hyderabad, will be manufacturing the desired paper for the tetra-brik aseptic pack.

The Russians have also agreed to import one million packs of Neramac's pineap, a pineapple fruit drink, according to Dr. Krishnaswamy, while speaking at the launch function of 'pineap', here on Friday.

Prepared from 100 per cent pineapple juice concentrate, pineap contains more fruit content than any other ready-to-serve beverage available in the market, he said. Pineap, is made from hand-picked, luscious pineapples grown in the orchards of Tripura and processed in Neramac's Rs. four crores fruit juice concentrate plant.
(The Economic Times 10 September 1989, 7)

317 Food technology from Sweden

Frigo Scandia, a Swedish food preservation equipment making company has introduced in India a modern quick freezing technique which will help increase value added exports of sea foods, processed vegetables and fruits.

The company which has supplied 60 per cent of the freezing equipment in Europe has developed "flofreeze" for quick freezing heavy and sticky vegetables, fruits, sea foods and, "gyro" compact system for spiral belt freezing.

An Indore-based Indian engineering company will manufacture freezing equipment using the Frigo Scandia technology to meet the growing needs of the food processing industry.

The Managing Director of the Swedish company, Mr. Holga Molin, said a Cochin sea food exporter increased realisation overseas by 30 per cent using his company's individual quick freezing technique.

It is estimated that India produces nearly seven million tonnes of fruits and vegetables every year but has an installed capacity of processing only about 0.6 million tonnes. Of this, the utilised capacity is nearly 35 per cent i.e., 0.21 million tonnes. Produce worth Rs.30,000 million is destroyed every year.

India's exports of processed fruits and vegetables were worth only Rs.4.5 million in 1988-89, while fresh fruits and vegetables exports stood at Rs.1200 million. Although India produces around 22,700 tonnes of meat products, its exports is amounted to only Rs.1100 million in 1988-89.
(Economic and Commercial News 19(41), 1989, 5)

318 List of foreign technical/financial collaboration cases approved by the Government of India during April 1989 and highlights of industrial licensing of foreign collaboration.

Sl. No.	Name & Address of Indian Company	Name & Address of Foreign Collaborator	Item of Manufacture
30.	Manoj Kumar Daga 16, Hare Street Calcutta-700 001	Lottee Co. Ltd Japan	Chewing Gum
42.	Automatic (Madras) Pvt. Ltd. D1, Ambattur Indl. Estate, Madras - 600 058	Booth Dispensers Ltd., U.K.	Automatic Vending Machines for Vending Cool drinks
		Pace Coatings Ltd U.K.	Automatic Vending machines for vending coffee tea.
		Pace Coatings Ltd. U.K.	Automatic Vending machines for vending snacks.
49.	Sakthi Soyas Ltd. 18, Orace Course Road Coimbatore-641 018.	Commonwealth Dev. Corpn., U.K.	Soyabean Oil
53.	Central Arecanut & Cocoa Marketing & Processing Co-Op. Ltd. (CAMPCO) P.B.No.223 Sahakari Mahal Mangalore-575001	Food Tek Inc. 28-East Hanover Avenue Morris Plains New Jersy 07950 USA	Chocolates

(Seminar Reporteur 19(5), 1989, 22-28)

319 Banned pesticides: US Export policy boomerangs

The U.S. policy of allowing shipment abroad of dangerous pesticides banned in the U.S. is now recoiling on the U.S. (President Carter had ruled that pesticides and chemicals banned in the U.S. should not be allowed to be exported. President Reagan reversed that order and Bush is continuing the Reagan policy).

Greenpeace, an International Environmental Organisation, said at a press conference on Sept. 5, that two chemicals - chlordane and heptachlor - manufactured in Memphis (USA) and exported to 25 countries though banned in the USA, have been found in beef imported by the U.S. from Honduras, in Garbanzo beans (chick peas), coffee beans, carrots and parsley from Latin America, in pineapples exported to the

USA from the Philippines, and in edam and provolone cheeses exported by Europe and transhiped to the USA through Puerto Rico. U.S. environmental organisations had predicted that this is precisely what would happen unless the US went back to the Carter policy. It called it "a circle of poison". The U.S. environmental protection agency barred use of the two chemicals for virtually all U.S. agricultural purposes in 1978 when tests showed that they caused tumours in laboratory animals. They are also suspected of causing diseases of the liver, eyes, central nervous system and the adrenal and thyroid glands.

Greenpeace called for legislation to prohibit the manufacture of the pesticides. Reagan took the position that it is not for the U.S. to legislate what foreigners would buy, and if U.S. manufacturers could earn some dollars in the process, it was all right with him. Bush is essentially taking the same stand, though publicly he is an environmentalist.
(Chemical Weekly 35(1), 1989, 38)

320 Irradiated food

More and more countries are gradually accepting the trade in irradiated food and its regional and international trade may start in the 90s, according to the Vienna based International Atomic Energy Agency.

Recent concerns over food borne diseases, food contamination and spoilage, particularly in the tropics had generated worldwide interest in food irradiation technology.

According to the agency press report, atleast 37 countries have accepted and 24 of them are already using food products preserved and processed by controlled use of gamma rays, X-rays, or electron beams.
(The Economic Times 13 November 1989, 8)

321 Duty on pulses cut

The Government has reduced duty on import of pulses from 35 per cent ad-valorem to 10 per cent ad-valorem.

This duty reduction, effective from November 1, has been done to make available adequate quantity of pulses at reasonable prices, says an official release.
(Financial Express 3 November 1989, 1)

322 Post-harvest losses

An integrated development plan is being evolved by the Government for increased utilisation of agricultural produce by reducing post-harvest losses, ensuring better returns to farmers, generating better employment and providing the consumer processed food at affordable prices.

Mr.Tytler pointed out that the country produced agro food material worth more than Rs. 60,000 crores, out of which only 12 per cent went in for food processing. He said that 35 to 40 per cent of the country's post harvest fruits and vegetables perished due to bad handling. This, if processed could provide a value addition of Rs.5,000 crores.

The Minister said that as a policy foreign tie-ups which included a re-export or buy back arrangements would be encouraged. He said the Government followed a liberal policy in the import of machinery for food processing which was not manufactured in India. He said a number of such items had been identified and placed under open general licence.

The policy towards foreign collaborations were also liberal and a number of countries were already involved in Centrally sponsored schemes to increase food production and quality, Mr.Tytler said.
(Financial Express 20 October 1989, 6)

323 Technology information centre

The Directorate General of Technical Development (DGTD) is in the process of establishing a technology information centre (TIC) to meet the information needs of user industries in select sectors.

This was announced by the secretary (TD) and DGTD, Mr.H.C.Gandhi, at a workshop on technology information services organised by DGTD, the delegation of the commission of the European communities and the Confederation of Engineering Industry (CEI) here on Friday.

Mr.Gandhi indicated that DGTD with the support of the delegation of the commission of the European communities and in consultation with prospective users - industrial units and associations, development finance institutions and RD organisations - was setting up the centre initially to provide information on future development trends and sources of supply of commercially proven technologies.

Mr.Gandhi observed that this was the first centre of its kind to be established in the country and technical assistance of the delegation of the commission of the European communities was, therefore, being sought.
(The Economic Times 2 October 1989, 2)

324 Excise incentive on oils withdrawn

The government has withdrawn the excise incentive scheme for use of minor oils in vanaspati and soap with retrospective effect from August 25. A notification has been issued by the finance ministry to this effect.

Under the scheme, manufacturers of vanaspati and soaps could get credit for payment of excise duty in respect of minor oils used by them. The scheme was introduced to encourage use of minor oils in manufacture of vanaspati and soap.

According to an official release, the government has found no longer necessary to continue this scheme after reviewing its relevance in the context of the present levels of production of edible oils in the country and the usage of these minor oils already achieved in the manufacture of soap and vanaspati.

The scheme was introduced in March 1986, under which the vanaspati and soap units were allowed to avail a deduction up to Rs. 1,000 per tonne in excise duty on usage of specified minor oils.

The vanaspati industry has criticised the government decision to withdraw the scheme, which in its opinion would raise the cost of producing vanaspati by Rs.1,000 per tonne.

In a statement, issued by Mr.G.K. Sood, chief executive of the Vanaspati Manufacturers Association of India, apprehends that the withdrawal of the scheme would halt growth in production of minor oils like rice bran, oils of the tree and forest origin and solvent extracted oils.

Moreoever, because of retrospective effect of the decision, the vanaspati industry would be compelled to shell out Rs. 1,1000 per tonne to excise authorities on the despatches made in the last four days without possibility of recovery from the customers, the statement has pointed out.

The credit lying in the books of vanaspati units, which was allowed to be used after a lock-in period of one month, has also been wiped out causing untold loss of excess cost, which the units have incurred by using minor oils in the previous months to accumulate the credit, it is pointed out.

FOOD REGULATION, QUALITY CONTROL AND HYGIENE

325 Water (Prevention and Control of Pollution) Amendment Rules 1989

GSR 717(E):- In exercise of the powers conferred by section 63 of the Water (Prevention and Control of Pollution) Act, 1974 (6 of 1974), the Central Government after consultation with the Central Pollution Control Board, hereby makes the following rules further to amend the Water (Prevention and Control of Pollution) Rules, 1975, namely:-

1.(1) These rules may be called the Water (Prevention and Control of Pollution) Amendment Rules, 1989.

(2) They shall come into force on the date of their publication in the Official Gazette.

2. In the Water (Prevention and Control of Pollution) Rules, 1975; (hereinafter referred to as the principal rules), in rule 24, the words "and shall be submitted to the Central Government by the 15th of May each year" shall be omitted.

3. In the principal rules, for rule 32, the following rule shall be substituted namely:-

"32. Application for consent - An application for obtaining the consent of the Central Board for establishing or taking any steps to establish any industry, operation or process or any treatment and disposal system or any extension or addition thereto, which is likely to discharge sewage or trade effluent into a stream or well or sewer or on land (such discharge being hereinafter in this Rule referred to as discharge of sewage); or for bringing into use any new or altered outlet for the discharge of sewage or beginning to make any new discharge of sewage under section 25 or for continuing an existing discharge of sewage under section 26 shall be made to the Central Board in Form XIII".

4. In the principal rules, after rule 33, the following rules shall be inserted, namely:-

"34. Directions (1) Any direction issued under Section 33A shall be in writing.

(2) The direction shall specify the nature of action to be taken and the time within which it shall be complied with by the person, officer or the authority to whom such direction is given.

(3) The person, officer or authority to whom any direction is sought to be issued shall be served with a copy of the proposed direction and shall be given an opportunity of not less than fifteen days from the date of service of a notice to file with an officer designated in this behalf the objections, if any, to the issue of the proposed direction.

(4) Where the proposed direction is for the stoppage or regulation of electricity or water or any other services affecting the carrying on any industry, operation or process and is sought to be issued to an officer or an authority, a copy of the proposed direction shall also be endorsed to the occupier of the industry, operation or process, as the case may be, and objections, if any, filed by the occupier with an officer designated in this behalf shall be dealt with in accordance with the procedures under sub-rules (3) and (5) of this rule.

Provided that no opportunity of being heard shall be given to the occupier, if he had already been heard earlier and the proposed direction referred to in sub rule (3) above for the stoppage or regulation of electricity or water or any other service was the resultant decision of the Central Board after such earlier hearing.

(5) The Central Board shall within a period of 45 days from the date of receipt of the objections, if any, or from the date upto which an opportunity is given to the person, officer or authority to file objections whichever is earlier, after considering the objections, if any, received from the person, officer or authority sought to be directed and for reasons to be recorded in writing, confirm, modify or decide not to issue the proposed direction.

(6) In a case where the Central Board is of the opinion that in view of the likelihood of a grave injury to the environment it is not expedient to provide an opportunity to file objections against the proposed direction, it may, for reasons to be recorded in writing, issue directions, without providing such an opportunity.

(7) Every notice or direction required to be issued under this rule shall be deemed to be duly served:-

(a) Where the person to be served is a company, if the document is addressed in the name of the company and its registered office or at its principal office or place of business and is either -

(i) sent by registered post; or

(ii) delivered at its registered office or at the principal office or place of business;

(b) Where the person to be served is an officer serving Government, if the document is addressed to the person and a copy thereof is endorsed to his Head of the Department and also to the Secretary to the Government as the case may be, incharge of the Department in which for the time being the business relating to the Department in which the officer is employed is transacted and is either:-

(i) sent by registered post, or

(ii) is given or tendered to him;

(c) In any other case, if the document is addressed to the person to be served and --

(i) is given or tendered to him, or

(ii) if such person cannot be found, is affixed on some conspicuous part of his last known place of residence or business or is given or tendered to some adult member of his family or is affixed on some conspicuous part of the land or building, if any, to which it relates, or

(iii) is sent by registered post to that person.

Explanation - For the purposes of this sub-rule:-

(a) "company" means any body corporate and includes a firm or other association of individuals;

(b) "a servant" is not a member of the family.

35. Manner of giving notice:- The manner of giving notice under clause (b) of sub-section (1) of section 49 shall be as follows, namely:-

(1) The notice shall be in writing in Form XV;

(2) If the alleged offence has taken place in a Union Territory, the person giving notice may send notice to:-

(i) the Central Board, and

(ii) the Ministry of Environment and Forests (represented by the Secretary to the Government of India); and

(iii) the Administrator of the Union Territory (represented by the Secretary/Head in-charge of Environment).

(3) The notice shall be sent by registered post acknowledgement due; and

(4) The period of sixty days mentioned in clause (b) of sub-section (1) of section 49 of the Act, shall be reckoned from the date it is first received by one of the authorities mentioned in sub-rule (2)"

(5) In Schedule I of the principal rules, -

(a) for Form XIII, the following shall be substituted, namely:-

FORM XIII

Application for consent for establishing or taking any steps for establishment of Industry/operation/process/or any treatment/disposal system for discharge, continuation of discharge under 25 or section 26 of the Water (Prevention and Control of Pollution) Act, 1974.

(See rule 32)

From

....
....
....

Date:..........

To

The Member Secretary,
Central Pollution Control Board,

Sir,

I/We hereby apply for Consent/Renewal of Consent under section 25 or section 26 of the Water (Prevention and Control of Pollution) Act, 1974 (6 of 1974) for establishing or taking any steps for establishment of Industry/operation process/or any treatment/disposal system to bring into use any new/altered outlet for discharge of "sewage/trade effluent"/to continue to discharge* sewage/trade effluent" from land/premises owned by............

The other relevant details are as below:

1. Full name of the applicant...............

2. Nationality of the applicant.............

3. Status of the applicant:

(a) Individual
(b) Proprietory concern
(c) Partnership firm (whether registered or unregistered)
(d) Joint family concern
(e) Private Limited Company
(f) Public Limited Company
(g) Government Company
    (1) State Government
    (2) Central Government
    (3) Union Territory
(h) Foreign Company
(if a foreign company, the details of registration incorporation, etc.)
(i) Any other Association or Body:

4. Name, Address and Telephone Nos. of the Applicant.
(the full list of individuals, partners, persons, Chairman (full-time or part-time), Managing Directors, Managing Partners, (Directors (Full time or part time), other kinds of office bearers are to be furnished with their period of tenure in the respective office, with telephone Nos. and address).

5. Address of the Industry :
(Survey No. Khasra No., location as per the revenue records, Village Firka, Tehsil, District, Police Station or SHO, jurisdiction of the First-Class Magistrate).

6. Details of commissioning, etc:-

(a) Approximate date of the proposed commissioning of work.
(b) Expected date of production:

7. Total number of employees expected to be employed.

8. Details of licence, if any obtained under the provisions of Industrial Development Regulations Act, 1951, --

9. Name of the person authorised to sign this form (the original authorisation except in the case of individual/proprietory concern is to be enclosed).

10. (a) attach the list of all raw materials and chemicals used per month.

(b) Licensed Annual Capacity of the Factory/Industry.

11. State daily quantity of water in kilolitres utilised and its source (domestic/industrial/process/boiler/cooling/others).

12. (a) State the daily maximum quantity of effluents and mode of disposal (sewer or drains or river).

Also attach analysis report of the effluents. Type of effluent quantity in kilolitres, Mode of disposal.

(i) Domestic
(ii) Industrial.

(b) Quality of effluent currently being discharged or expected to be discharged.

(c) What monitoring arrangement is currently there or proposed.

13. State whether you have any treatment plant for industrial, domestic or combined effluents.

Yes/No.

If yes, attach a description of the process of treatment in brief. Attach information on the quality of treated effluent vis-a-vis the standards.

14. State details of sold wastes generated in the process or during waste treatment.

Description	Quantity	Method of collection	Method of disposal

15. I/We further declare that the information furnished above is correct to the best of my/our knowledge.

16. I/We hereby submit that in case of change either of the point of discharge or the quantity of discharge or its quality, a fresh application for CONSENT shall be made and until such CONSENT is granted no change shall be made.

17. I/We hereby agree to submit to the Central Board an application for renewal of consent one month in advance of the date of expiry of the consented period for outlet/discharge if to be continued thereafter.

18. I/We undertake to furnish any other information within one month of its being called by the Central Board.

19. I/We enclose herewith cash receipt no./bank draft no........dated............ for Rs........(Rupees.........................)................) in favour of the Central Pollution Control Board, New Delhi, as fees payable under section 25 of the Act.

Yours faithfully,
Signature of the applicant

Note: *Strike out which is not relevant.

(b) after Form XIV, the following new Form shall be inserted, namely:-

"FORM XV

(See Rule 35)

FORM OF NOTICE

By registered post
acknowledgement due

From

....

....

....

....

To

....

....

....

Notice under section 49 of the Water (Prevention and Control of Pollution) Act, 1974.

Whereas an offence under the Water (Prevention and Control of Pollution) Act, 1974, has been committed/is being committed by...

(2) I/We hereby give notice of 60 days under section 49 of the Water (Prevention and Control of Pollution) Act, 1974 of my/our intention to file a complaint in the court against.....................
(2) for violation of section..............................of the Water (Prevention and Control of Pollution) Act, 1974.

In support of my/our notice, I am/we are endorsing the following documents (3) as evidence of proof of violation of the Water (Prevention and Control of Pollution) Act, 1974.

......................Signature(s)

Place..................

Date..................

Explanation :-

(1) In case the notice is given in the name of a company, documentary evidence authorising the person to sign the notice on behalf of the company shall be enclosed to this notice. Company for this purpose means a company defined in Explanation to section 47 of the Act.

(2) Here give the name and address of the alleged ocender. In case of a manufacturing/processing operating unit, indicate the name/location/nature of activity, etc.

(3) Documentary evidence shall include photographs/technical reports/health reports of the area etc. for enabling enquiry into the alleged violation/offence".

No. Q-15011/3/88-CPW
G.SUNDARAM, Jt. Secy.
(The Gazette of India Part II - Section 3-sub-section(i) No.391, 27 July 1989)

326 Vitamins protect against cancer

There is now overwhelming evidence that a diet rich in fruit and vegetables can help to reduce the risk of cancer, an epidemiologist from the National Cancer Institute in the US said earlier this week. Gladys Block, speaking before the opening of an international conference on the role of vitamins in preventing disease, said that there had never been an adequate campaign to persuade the public that there is "strong scientific evidence" that vitamins can help to protect against cancer.

William Pryor, professor of chemistry and biochemistry at Louisiana State University in the US and chairman of the conference, said that many doctors did not want to recommend vitamin supplements for fear that people would take these instead of eating a balanced diet. It would be better, he said, if people could eat plenty of fresh fruit and vegetables.

Block said that the American guidelines on diet suggest that people eat five servings of fruit and vegetables a day, yet surveys have shown that many people consume much less than this amount. It would not be possible to obtain the recommended daily intake of vitamin C, for example, from a single serving of vegetables, she said.

Vitamins such as C and E, as well as the compound known as provitamin A, or betacarotene, exert their protective effect by combating damaging reactions in the body's cells.
(New Scientist 7 October 1989, 23)

327 Tapioca the culprit behind goitre in Kerala: study

Tapioca, a staple in the Kerala diet, could be implicated in the development of diabetes and goitre in the State.

A laboratory study carried out on rats at the Trichur Medical College, and presented at the recent all India endocrine conference, suggests that regular consumption of Tapioca might lead to pancreatic and thyroid damage. The damage is attributed to cyanogenic glycosides in tapioca.

The study by Dr.Annamma Mathew and Dr.Zachariah Thomes corraborates the correlation reported from other parts of the world (notably Africa) between tapioca consumption and the fibro calculus pancreatic diabetes (FCPD). It is a common form of diabetes in Kerala.

If regular tapioca consumption causes thyroid damage, as suggested by the study, it would explain the incidence of goitre in the State. Goitre is endemic along the sub-Himalayan belt and has been held to be the result of insufficient iodine in the diet. But goitre should be negligible in coastal areas like Kerala, where there is ample fish consumption.
(The Hindu 1 November 1989, 3)

328 Aflatoxin in soyabean and sunflower

Samples of soyabean and sunflower seeds were procured from different areas like Madhya Pradesh, Tamil Nadu, Karnataka etc. In all 29 soyabean and 76 sunflower seed samples were analysed for aflatoxin content at the Central Agamark Laboratory, Nagpur.

Out of the 29 samples of soybean 4 samples of soyabean were found to be affected by aflatoxin in the range of 25-120 ppb. Regarding sunflower seed samples, 5 samples out of 67 were found infected with aflatoxin in the range of 60 to 750 ppb. Though the aflatoxin content was more in soyabean than in sunflower, the percentage of infected sunflower seed samples was only 7.4 while that of soyabean samples was 17. The results clearly indicate that sunflower seed definitely supports the aflatoxin production in Indian climatic conditions.

Under the statutory food laws in our country, maximum limit for aflatoxin content has been prescribed only for groundnut kernel - viz 30 ppb. However the other countries have also prescribed the maximum limit for aflatoxin content in various commodities upto 50 ppb.

In view of the above, it is suggested that appropriate limits for aflatoxin content be prescribed under the Indian Food Laws for these two oilseeds.
(The Oils and Oilseeds Journal 41(7-9), 1989, 87-89)

329 High DDT residue in milk

A brand of packed milk which is, widely marketed all over the country by a leading company is found to have DDT residues much above the maximum residue limit (MRL) prescribed by the World Health Organisation, it is learnt.

WHO has prescribed MRI for various pesticide compounds in case of all the agrobased products including milk and has intimated all the member countries for suitable action. For milk and milk products, WHO has set a tolerance limit for DDT residues at 1.25 PPM (part per million).

The high rate of DDT has come to light following a test conducted by a leading private sector laboratory a few weeks ago. The findings have clearly shown the residues at an alarmingly higher level in the tested samples.

According to informed sources the entire milk collected by this company from the farmers of major milk producing centres contain high rate of DDT residues.
(The Economic Times 16 October 1989, 6)

330 Ban on non-iodized salt sale

Iodine, in traces, is considered as one of the essential elements for proper functioning of the hormones of thyroid glands which control the basic rate of metabolism in human life. Iodine deficiency, according to experts can cause a number of complications, such as goitre, swelling of thyroid glands, abortion and slowed physical and intellectual development.

In view of the fact that non-iodized salt is one of the factors creating major health hazards, its sale for edible purposes has been made a penal offence by the Delhi Administration. According to an order issued by the Administration under the Prevention of Food Adulteration Act, 1954, the sale of non-iodized common salt on or after 1 June 1989 will be punishable with imprisonment for a period not less than six months, subject to a maximum period of three years and/or a fine of at least Rs.1000.

For the guidance of the manufacturers, the Bureau of Indian Standards has published an Indian Standard (IS 7224:1985) which prescribes the requirements and methods of sampling and test for iodized salt. The Standard, which recommends the use of potassium iodate or any other iodate for iodizing the salt, specifies addition of a minimum of 20 parts per million of iodine to it. It also prescribes for water-soluble matter, matter soluble in water than sodium choloride and chloride content.
(Standards India 3(1), 1989, 13)

331 Unwashed green vegetables can cause brain infection

Vegetarians beware, Some of the green vegetables, when taken without washing can cause neurocysticerosis (NCC), an infection of the central nervous system, specially the brain.

According to earlier theories the disease was thought to be confined only to pork eaters. It was regarded as infection of the nervous system caused by the larval stage of the pork tape worm - Taenia solium.

Neurosurgeons participating in the ninth International Congress of Neurosurgery here observed that the disease was not confined to pork eaters only. It had been reported in vegetarians and also in those who do not consume pork.

The parasite when ingested through food, breaks out of the intestine swims up the bloodstream and enters the brain, making the organ swell and throwing patients into seizures. "Unwashed and poorly cooked green vegetables used in salads breed the parasiti and are a major source of the infection in India, " Dr.Vijay Kak, a neurosurgeon from Chandigarh said.

The spectrum of NCC infection in India is different from that observed in other endemic areas like Latin America and Africa Dr.Sanjiv Bhatia observed. Mexican doctors have reported the infection to be localised and treated by surgery, but the Indian variety of the infection is more diffuse and surgery does not usually help, he said.
(Deccan Herald 14 October 1989, 11)

332 Salmonella survives even in cooked eggs

Four teams of scientists from public health laboratories of U.K. have determined how salmonella survives in cooked eggs.

The scientists from laboratories in Exeter, Poole, Sheffield and London, injected known amounts of known strains of salmonella bacteria into the yolks of raw eggs. They then cooked the eggs in a variety of ways and attempted to recover viable bacteria from the finished products. Their results show that the salmonella bacteria, which are present in the yolk of eggs, are able to survive in cooked eggs.

The scientists boiled some eggs for up to eight minutes and fried others with the yolk facing up. When they did this, some or all of the yolk remained liquid and the yolk did not reach 80 C, the temperature that kills salmonella. The scientists found that the number of salmonella that survived did not seem to depend on the strain or on the quantity of bacteria that they inoculated.

In some of these experiments, the researchers used Salmonella enteritidis PT 141, the strain implicated in recent outbreaks of food poisoning associated with eggs: They were able to recover up to 75 per cent of the original bacteria alive.

Next, the scientists subjected the various strains of salmonella to more extreme heat; they scrambled them or fried them "over-easy" that is, turning them over halfway through cooking. Here, they found that the survival of salmonella depended more on the strain or the size of the initial inoculum. S.entertidids PT141 was more sensitive to heat than most other strains.

When the scientists inoculated eggs with less than 10^8 cells per gram of yolk or per gram of a mixture of yolk and milk, they were able to destroy all the bacteria in a number of ways: by cooking scrambled egg rapidly at high temperature, by boiling for nine minutes or more, or by frying the egg on both sides until all the yolk had solidified.

The scientists admit that the size of the inoculum is large. But thay showed that a low inoculum of 10^7 cells per yolk could increase to this level in just 48 hours at room temperature. They warn that eggs should be kept in the fridge, then allowed to warm to room temperature before cooking. This will ensure that during cooking the whole egg reaches temperatures that are lethal to Salmonella.
(New Scientist 23 September 1989, 32)

333 Quick test for cholesterol levels

Soviet scientists at the Institute of Physico Chemical Medicine in Moscow claim to have developed a simple method for estimating the levels of cholesterol in the blood based on levels of cholesterol in the skin. The diagnostic kit, now being offered for export, consists of a cholesterol-binding reagent and a solution that changes colour in the presence of cholesterol.

The scientists place three drops of the reagent - each of a different concentration - on the palm of the hand, then wash it off after a short time. They then apply drops of the solution to the same spots on the hand.

If the solution turns red only where the concentration of the reagent is highest the individual is considered to be healthy. If the spot with a medium concentration of reagent also turns red, the person is considered to be at risk of developing coronary heart disease.

If all three spots develop colour, the person supposedly already has clinical disease. The researchers have not yet given details of the reagent.
(The Hindu 25 October 1989, 23)

334 Urinary stones and tamarind

Tamarind, a regular ingredient of south Indian dishes, may be responsible for the low incidence of urinary stone disease in the southern states compared to north India, according to researchers in the Trivandrum medical college hospital, reports UNI.

A team of researchers led by Dr.Fazil Marickar, Associate Professor of Surgery, has found that tamarind, which is rich in potassium bitartrate and tartaric acid, inhibited crystallisation of calcium oxalate in urine.

Administration of tamarind and tomato produced a significant reduction in the number and size of calcium oxalate dihydrate (COD) and calcium oxalate monohydrate (COM) crystals in short-term and long-term studies.

In about 52 per cent of the patients the COD and COM crystals disappeared after tamarind treatment. In the rest the mean number of crystals per high power field was brought down from eight to two. The effect of tomato was less remarkable than tamarind.
(NIPCCD Newsletter 8(5), 1988, 11)

TRANSFER OF TECHNOLOGY AND NEW INDUSTRIES

335 Modern food to expand

Modern Food Industries (India) Ltd will be setting up two more new bread plants to its existing unit in Delhi. Besides, the company has an ambitious plan to launch a fruit processing unit in Jammu and Kashmir and a marine food processing unit.,
(Industrial Products Finder 17(12), 1989, 113)

336 Pact with US on food processing

To avoid wastage of food and promote exports, India will cooperate with the United States in a big way in the comparatively new field of food processing and preservation.

This was disclosed by Mr. Jagdish Tytler, Minister of State for Food Processing, while talking to newsmen recently. He said that the US had agreed to help India set up a training institute for food processing and also exchange business delegation to identify areas for further cooperation.
(Industrial Products Finder 17(12), 1989, 103)

337 Amrit protein unit inaugurated

Amrit Protein Foods Ltd., a company promoted by Amrit Banaspati Co. Ltd, was inaugurated recently. The unit set up at Ghaziabad, at a total outlay of Rs.15 crore, will produce soya milk and soya milk beverages in various flavours.
(Chemical Products Finder 8(3), 1989, 133)

338 All seasons foods' new plant

All Seasons Foods' new plant at Nasik is expected to launch production soon. The plant will be making not only ready-to-eat meals but also many new products such as baby foods, milk and malt-based products and energy-based products etc. The company's current year target is to achieve a turnover of Rs.100 crore. During 1988, its sales have increased to touch Rs.25.76 crore.
(Industrial Products Finder 17(10), 1989, 79)

339 Citric acid plant in Punjab

The first citric acid plant in the country using sugar as raw material will be set up in Punjab. The Punjab State Federation of Cooperative Sugar Mills' Managing Director, Mr.Gurdev Singh, said that the Rs.15 crore plant will have a capacity to produce 5,000 tonnes of citric acid every year. It will be set up in collaboration with a Polish firm. The plant will provide direct employment to 150 people and indirect employment to hundreds of others.
(Chemical Weekly 34(49), 1989, 69)

340 New packaging machines

An Indo-German collaboration venture has just developed a new packaging machine that may well revolutionise the role of packaging industry in this country.

The Indian firm concerned is the Cockerill Equipment Private Limited and the German partner is Piepenbrock Verpackungstechnik.

The joint venture has come up with a truly customised yet versatile packaging machine which can pack oils as well as host of other products. It has exciting possibilities and may well be the answer to the problems of the wide network of the public distribution system which has for long looked for just this sort of machine. It will soon be produced on a commercial scale in India.

The new machine will enable various government-run organisations and private companies processing edible oils to finally introduce the perfect flexible laminated film pouch with edible oil packed in it. The film pouches are guaranteed, unadulterated and uncontaminated and edible oils will not turn rancid while still on the shelf.

Cockerill Equipment expects that the spinoff from its joint effort with Piepenbrock Terpackungstechnik can mean an expanding market for this new machine, painstakingly developed for India, in other countries of South East Asia with similar edible oil distribution and consumption patterns. According to the firm, edible oils have never been packed in this manner for such consumption purposes, anywhere else in the world.

This association covers a wide spectrum of machines, and complete plant equipment for use in packaging and food processing.

For details contact: Cockerill Equipment P.Ltd., 12, Tribhuvan Road, Ratan House, Bombay - 400 004.

PERSONALIA

-Nil-

BIBLIOGRAPHIES JUST PUBLISHED

The National Information Centre for Food Science and Technology, CFTRI, Mysore, has just compiled the following annotated bibliographies:

(i) BEET MOLASSES

covers the period from 1959 to 1988,
lists 94 titles with abstracts

(ii) GRAIN MOISTURE METERS

covers the period from 1959 to 1988,
lists 34 titles with abstracts

Price Rs.50/- for each plus postage.

Copies can be had from:

The Sales and Distribution Officer
CFTRI Library
MYSORE 570 013

The Demand Draft should be drawn in favour of the Director, CFTRI, Mysore.

SPECIAL ARTICLE

FLEXIBLE PACKAGING OF HEAT PROCESSED AND FROZEN FOODS

M. Mahadevaiah
Central Food Technological Research Institute, Mysore-570013

RETORTABLE POUCH

Retortable pouch has been developed as an alternative to metal cans and glass bottles for packing processed food products. The retortable pouch is a flexible laminated pouch which can withstand thermal processing temperatures of 120-130°C, and combines the advantages of metal can and the plastic boil-in-bag. The material for retort pouch must also provide superior barrier properties for a long shelf-life, seal integrity toughness and puncture resistance.

Development of the retort pouch concept began in the United States in the early 1950's. Much of the work done by the U.S. Army Natick Development Centre was to use retort pouches to replace the metal cans in military combat rations. Material development was poineered by Reynold's Metals Co., and Continental group.

The retort pouch products were test marketed during 1960's in the U.S. and the results were encouraging. Japanese and European firms obtained U.S. methods and technology through licencing arrangement which allowed them the production of food products packed in retort pouch in the late 1960's. The retort pouch concept is gaining popularity in these countries and a number of food products are being packed in retortable pouches under commercial scale. Many developments have taken place in recent years on this line with special reference to the development of packaging materials and the processing methods.

In India, preliminary research investigations have been carried out at CFTRI, Mysore, to evaluate the suitability of various combinations of laminate pouches with number of indigenous food products and to standardise the processing conditions. The results of these studies are encouraging.

Packaging materials

The development of suitable packaging materials for packing processed food products is the basic criteria for the success of the process. The first material developed for this purpose was a laminate made of polyester/aluminium foil/polyvinyle chloride. Later on this was superseded by many other combinations like polyester/foil/mo-dified polyolefin (high density polyethylene blended with polyisobutylene), polyester/foil/high density polyethylene, polyester/foil/nylon and polyester/foil/cast polypropylene. The two prevailing three ply laminates are polyester/foil/modified polyolefin and polyester/foil/polypropy-lene - ethylene copolymer[1]. Typical current retort pouch materials are given in Table 1. For research studies at CFTRI, pouches made of indigenous polypropylene, nylon/cast polypropylene and polyester/foil/cast polypropylene obtained from Japan and West Germany were used.

TABLE 1

TYPICAL CURRENT RETORT POUCH MATERIALS

---

9 to 25 micron polyester/9 to 12 micron foil/75 micron modified polyolefin (C-79).

12 to 25 micron polyester/9 to 25 micron foil/50 to 85 micron ethylene-propylene copolymers and/or blends

15 to 30 micron polyamide/50 to 75 micron cast polypropylene

15 micron polyamide/70 micron modified polyolefin (C-76)

30 to 40 micron polyamide/50 to 75 micron medium density polyethylene

30 to 50 micron polyamide/50 to 75 micron polypropylene copolymer and/or blend

12 micron polyester/12 micron foil/12 micron polyester/75 to 85 micron ethylene propylene copolymers and/or blends

12 micron polyester/9 micron foil/15 micron oriented polyamide (Nylon 6)/50 micron polypropylene

---

Among the requirements for retort pouch films, for foil laminates the gas permeability should be less than 15 cc/m^2 / 24 hr/atm., water vapour transmission rate should be less than 0.8 g/m^2/24 hr. and should resist temperatures from below 0°C to 121°C. For foil free laminates, where short shelf-life is expected, the gas permeabilities can be 77-93 c.c./m^2/24 hr./atm and moisture vapour transmission rates of 31 to 46 gm/m^2/24 hr. are acceptable. The range of current performance requirements for sterilizable materials is incorporated in Table 2.

TABLE 2

RANGE OF CURRENT PERFORMANCE REQUIREMENTS FOR STERILIZABLE MATERIALS

Requirement	Criteria
Sterilization temperature	116 - 145 C
Oxygen permeability	0 cc/m^2/24 hr/atm
Water vapour transmission rate	0 g/m/24 hr
Seal strength (tensile)	2-3.3 kg/10 mm
Bond strength	150-500 g/10 mm
Heat seal range	160-260 C
Thickness tolerances	±2 microns (inner ply only) 10% value ±7.0 g/m^2 (inner ply only)
Burst test	7.5 kg/15 mm seal (method 1) 17.2x10^4 Pascals for 30 sec.
Residuals solvent (taint)	30 mg/m^2 (method 4) 0.5 ppm as toluol.

The packaging materials should also resist the food simulating solvents such as water and acetic acid solutions under thermal processing temperature conditions at about 121°C.

It is preferable to have flat shape to attain better sterility with minimum overcooling of peripheral volumes. and to gain convenience through fast reheating for consumption.

Production systems

Filling systems used for retort pouches range from manual to fully automatic with variations and combination of both contamination of seal surfaces with food or moisture should be avoided at the time of filling.

Unit operations for packing of food products in retortable pouches are mostly similar to canning operations. The following three different systems are adopted for this purpose.

(i) Use of preformed pouches, manual or automatic pouch opening and filling, manual transfer to vacuum and sealing machine and subsequently processing.

(ii) Pouches are formed from roller stock film, filling of the product, partial sealing, removal of air from pouches, sealing and processing.

(iii) A lower web of foil free formable films is drawn horizontally over heated dies and vacuum is applied into multiple pocket or tray configuration. After putting the product in the pockets a sound web is drawn over the top of the lower web and heat sealed.

As in the case of metal cans, air has to be removed from the pouch by adopting any one of the following methods.

Snorkel technique, vacuum chambers, counter external pressure and steam flush.

Fat and water contamination of seal areas reduces seal strength considerably. Impulse heat sealing is generally more desirable than conventional heat sealing of pouch, since seal area contamination can be more easily overcome. Proper resistance seal bar (heated jaw) design can also overcome seal area contamination to a great extent.

A simple flat shaped filling funnels have been fabricated and adopted at CFTRI for filling liquid and semi solid products like meat curry and concentrated gravy to avoid seal contamination. Exhausting was carried out by putting pouches in the perforated vertical stands fabricated at CFTRI and passing through conventional steam exhaust box and sealed by using impulse sealer.

Process determination

Thermoprocessing conditions like process time and temperature for pouches have been generally determined by methods adopted for metal cans based on the procedures established by Ball and subsequent thermoprocess investigators[2].

Generally F_o values suitable for commercially canned products are adequate for retort pouches. However, modifications have been made for specific product process requirements.

Heat penetration studies have been carried out at CFTRI to determine the process time for some of the meat products and vegetables packed in different sizes of retortable pouches (unpublished data).

Processing of Retort Pouches

Thinness of the packaging material and flat shapes of the new containers permit very high rates of heat transfer and the benefits of a high temperature short time sterilizing process. But control of this process is usually critical, whether the thermal media is hot water with over-riding air pressure, standard steam cook, or steam-air mixture[3,4].

TABLE 3

COMMERCIALLY FEASIBLE RETORT POUCHED PRODUCTS

Type of Product	Typical Products	
Sauces with meat seafood and/or vegetables (ready meals)	Beef stew	Beef stroganoff
	Stewed veal with peas	Sweet and sour pork
	Hungarian goulash	Sukiyaki
	Rice with seafood	Beef bordelaise
	Assorted meat curries	Bamboo shoots in sauce
	Chicken a la king	Beef slices in barbecue sauce
	Sloppy Joe	Meatballs in barbecue sauce
	Bar-B-Q chicken sauce	Roasted chicken in
	Duckling with chestnuts	Rabbit with rice
Sauces	Prepared tomato sauces	Bean-cured seasoning sauce
	Rice sauce (with) and	
	Cream sauces (with vegetables)	without mushrooms
Meats (minimum liquid)	Ham Meatballs	Pork luncheon fingers
		Sliced pork luncheon meat
	Chicken hamburger	Beefsteak
	Frankfurters	Ham & chicken loaf
	Beef loaf	Tuna meat (in oil)
	Pet foods	
Vegetables	Potatoes	Carrots (some in sauces)
	Sauerkraut	Mushrooms (some in sauces)
	Beetroots	Celery in cheese sauce
	Beans in tomato sauce	Fried rice
Fruits	Crushed pineapple	Rhubarb
	Apples	Prunes
	Applesauce	
Soups	Variety	Shark's fin
Bakery items	Fruitcake	Cherry, maple, chocolate
	Spice cake	Orange and pineapple nut cakes
	Pound cake	
	Rhum baba	

The retorts which were earlier developed for sterilizing food in cans or jars, have been adopted to the new pouch and semi rigid containers. Although, they appear satisfactory, actual tests indicate an important lack of uniformity in heating medium temp. throughout the retort load.

In order to achieve an effective HTST process by taking the advantage of the rapid heat transfer characteristics of the new containers, FMC corp. developed a batch type system which would properly sterilize the new flexible convenience food containers. A list of commercially feasible retort pouched products is given in Table 3.

Quality of the food products packed in retort pouch

The results of the various workers on the quality of different food products in retort pouches are reviewed below[5].

Fruit products like peaches in syrup, rhuberb in syrup, cranberry sauce, mango pulp, passion fruit pulp etc., packed in foil pouches were found to be better than the canned product as judged by sensory evaluation with respect to their physico-chemical characteristics. The shelf-life was found to extend upto 18 months at 20°C.

Similarly the quality of some vegetables packed in retort pouches were found to be better than canned products. The pouched vegetables retained better nutrients like vitamin C, calcium, thiamine, riboflavin etc. as compared to the canned vegetables. The shelf-life in nylon/pp pouches was found to be 1 month at 20°C, and in foil pouches 12 months at 20°C.

A wide range of meat and fish products were packed in retort pouches and shelf-life studies have been carried out by many research workers. The studies include the determination of thermal process time, influence of residual gases, and the sensory quality of the products. The results indicated that the products packed in foil free laminates the shelf-life is low ranging from 1 to 5 months at 20°C and in foil laminates it extends upto 2 years at 20°C.

However, the experiments carried out at CFTRI indicated that meat products such as concentrated meat gravy, meat chunks in curry and meat biryani packed in pouches of nylon and cast polypropylene, kept well upto 1 month at 37°C and thereafter flavour loss was fast. On the otherhand meat products packed in foil laminate pouches, the products were acceptable upto 6 months at 37°C. Incidentally it was noticed that the flavour of the products stored at 37°C was better as compared to the products stored at ambient temp. of 25-30°C. Approximate shelf-life of different food products packed in retortable pouches is incorporated in Table 4.

TABLE 4

APPROXIMATE SHELF LIFE OF RETORT-POUCHED FOODS

Pouch construction	Outer package	Products	Approximate shelf life
30 micron nylon /60 micron cast polypropylene	Paperboard carton	Vegetables	1 month at 20°C
40 micron nylon/ 12 micron PVdC/ 50 micron polypropylene	Paperboard carton	Meat entrees Vegetables	5 months at 20°C
30 micron nylon/ 60 micron cast polypropylene	Formed polymer tray flushed with nitrogen	Vegetables	7 months at 20°C
12 micron polyester/ 9 micron foil/75 micron polypropylene or polyethylene blend	Paperboard carton	Entrees	2 years at at 20°C commercially 8 years at 20°C for military rations

Secondary Packages for retortable pouches

Folding cartons are used as an external wrap for the pouch. The alternate method of secondary packaging is the skin packaging.

Economics

For packing of food products in retort pouch, the initial investment on the machinery for filling/sealing and processing is high as compared to the packing of food products in traditional metal continers. However, this is compensated by the low cost of the packaging materials, storage space, trnsportation of empty and filled pouches.

ASEPTIC PACKAGING

Aseptic packaging technology was developed to produce sterilized shelf stable products which are free from bacteria and spores, and packed in economical containers for long range distribution, retaining the good quality of the product.

The process involves separate sterilization of the product and the package, bringing the two together in a sterile environment, filling and sealing the package to prevent recontamination. The basic operation consists of (i) commercial sterilization of the product by heating to predetermined time and maintaining the sterility till they are cooled, (ii) filling into sterile containers and sealing aseptically[6].

Aseptic packaging process is adopted for packing liquid products like fruit juices and soft drinks in unit packs and for fruit juice concentrates and fruit puree, tomato puree and paste and pulp in bulk packages. The popular systems available commercially are tetrabrick, tetrapack, Tito Manzini, Franrica, Scholle Autofill, Alfa Laval Plant, combibloc, crepaco, cherry Burrell, steriglen, Elpo, Bosch etc.[7].

Packaging materials and forms

The popular flexible packaging material used for packing fruit juices, ready-to-serve beverages and soft drinks consists of polyethylene coating (0.65 mil)/paper board (240 g/m^2), polyethylene lamination (0.65 mil), aluminium foil (0.30 mil^2)/ polyethylene coating (0.35 ml), polyethylene coating (1.5 mil). The material used for tetrapak consists of 1 mil polyethylene/0.35 mil aluminium foil/0.5 mil poly/16 mil kraft paper board/0.5 mil polyethylene. Brick pack consists of PE/ Paper/PE/aluminium foil/PE lamination, which is formed, filled and sealed into a brick shaped carton[7,8].

Bag-in-box system is an important development of aseptic packaging technology for bulk packaging of various food products. In this system flexible bag is placed inside a rigid transport container of corrugted or solid fibre board. The bag is made of material having high strength and excellent barrier property which could be presterilized.

Earlier studies indicated that laminated films with aluminium foil and polyvinylidene chloride (PVDC) copolymer coatings with polyethylene or polypropylene as the sealant layer is suitable in this system.

The newer structures used are made of coextruded PE/PVDC/PE for short shelf life and PE/Metallised polyester/PE for long shelf life. Such packages are available in the capacities ranging from about 5 to 1000 litres. Corrugated fibre board box provides physical protection for the bag, stack strength and means for transportation and handling.

Bulk packaging in such packaging materials are quite relevant to Indian conditions for packing fruit juice concentrates, fruit pulps, purees and tomato paste. These are very convenient for export and for storing in food processing units for subsequent preparation of different products.

Sterilization of packaging materials

Sterilization of packaging material is a very important operation to free the surface from microorganisms before processing. Different methods are followed to achieve this using hydrogen peroxide for effective destruction of microorganisms on plastics. Radiation sterilization using gamma rays, UV or electron acceleration is used for sterilization of bulk aseptic bags.

Quality of the asepticlly packed products

Fruit juices and RTS beverages packed in tetrapak cartons based on waxed paper/foil/poly was found to give a shelf-life of about four months as compared to the conventional packs which normally gives about 2 months shelf-life. Chan et al[7]., have studied the effect of storage temperature and time on the quality of aseptically processed bag-in-box package of guava and papaya puree. Considerable changes were observed in colour, flavour and ascorbic acid content at 38°C. The ascorbic acid loss was about 30% at 38°C after 3 months in guava puree. Similar trend was noticed with papaya.

Traditional method of packaging fruit products in flexible packaging materials

Fruit juices, fruit juice concentrate and fruit pulps can also be packed by traditional processing methods in different types of flexible packaging materials, which can be adopted in the existing fruit processing factories in the country.

The following different types of materials can be used for this purpose.

i) 12 micron plain polyester/37 micron polyethylene,
ii) 12 micron metallised polyester/100 micron polyethylene,
iii) 12 micron polyester/12 micron aluminium foil/100 micron polyethylene.
iv) One side 12 micron metallised polyester/112 micron HD-LD coextruded and other side 12 micron plain polyester/112 micron HD-LD coextruded.

Experiments were carried out at CFTRI by filling the mango juice heated to 85°C, sealing and processing in water at 85°C, for 10 min. and cooled..

The results indicated that pouches of PET/foil/PE was suitable for packing mango juice upto 10 weeks storage at ambient temp (25-30°C) and 8 weeks at 37°C Met.PET/PE and Met.PET/HD-LD + PET/HD-LD was suitable upto 7 weeks storage at ambient temp. and 5 weeks at 37°C. PET/PE was having poor shelf-life as compared to other flexible packaging materials.

PACKAGING OF FROZEN FRUITS AND VEGETABLES

Food Products like fruits, vegetables, meat and fish are preserved by freezing process which will inactivate the microorganisms. Freezing is carried out at a temperature below -18°C., and maintaining the same temperature during storage in order to avoid microbial growth. Fruits are frozen for later use in making preserves, jam, jellies, ice cream, desserts etc. It is preferable to freeze in the form of pulp or crushed form to eliminate oxidation during freezing, storage and thawing and to have long shelf life. Vegetables, meat and fish in the original form or after converting into different products are also freezed on a commercial scale to extend their shelf-life[9].

Packaging of frozen products

To prevent deteriorative changes, frozen products are to be packed in a suitable packaging materials with appropriate packaging methods. The main requirements of effective packaging materials are low permeability at 0°F to moisture, oxygen and volatile odours, good mechanical strength, easy sealability, air tightness,[6] flexibility and laminates being intact at temperatures as low as -29°C.

Different materials available for packaging of frozen foods are as follows:

(i) derivatives of paper such as wax cartons,
(ii) cellulose such as cellophane,
(iii) polyethylene and polypropylene in plastics,
(iv) Pliopfilm in rubber, and
(v) laminates.

Newer Packages:

Among the new packaging materials, polyethylene films, coatings and laminations are most important. Polyethylene has better moisture barrier properties and low temperature properties than wax and wax coated papers and other materials used earlier except aluminium foil laminates. Its advantages are transparency, low cost, ease of opening and ease of reclosure[6].

The polyethylene coated polyester film bag became popular for "boil-in-bags" prepared vegetable package. Such bags are put in boiling water for a few minutes in order to bring the food to serving temperature. For frozen fruits in sugar syrup "thaw pack" is used which enables to thaw the ice crystals by immersing in boiling water.

The folding carton with hot melt polyvinylidene chloride coating is becoming popular due to its better barrier properties and convenience to seal the ends. The better body and stiffness of polypropylene, and its excellent clarity is preferred to the low density polyethylene for the bagged frozen vegetable market.

The use of foamed polystyrene sheeting or molded polystyrene foam as an outer container for a multipack of pouches of frozen vegetables or fruits would result in both an attractive and a functional package[10].

FUTURE SCOPE AND CONCLUSION

The food processors should exploit the information available on the suitability of retort pouches and come forward to introduce various food products like fruit and vegetable products, meat and fish products, cereal products etc. packed in retort pouches and to explore the possibility of introducing such products on a commercial scale within the country and also create export potential. This will go a long way in replacing the traditional metal cans and glass bottles thereby reducing the cost of processed food products which are considered as luxury items in developing countries like India. This will be a boon to urban population where the vagaries of cooking can be minimised and the house-wife can be relieved from the routine drudgery of kitchen.

Aseptic packaging of fruit juices and milk in unit packs for internal consumption and fruit pulps, fruit juice concentrates, tomato puree and paste has been introduced recently by a few leading food processing factories in the country. Gradually the trend is increasing and this will be a boon for the exporters of such products and also to avoid seasonal glut of raw materials and to utilize the aseptically preserved products for the preparation of other finished products during off season in the country. However, the problems relating to colour deterioration, flavour loss and accidental puncturing of packaging materials have to be looked into to make it more popular.

There is a good scope for the introduction of frozen foods which are packed in a suitable flexible packaging material especially in urban areas. Frozen fresh fruits and vegetables or their semi processed products, meat and fish products can become popular due to the retention of quality and the nutrients in the products better than other processed food products.

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